modern machine shop

FEATURES IN BRIEF
See Page 2
REDUCED OBSOLESCENCE
See Page 102
COMPLEX FORMING
See Page 136

JULY 1957

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Vol. 30 No. 2 July, 1957

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SOLUBLE AND
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features in t

PLANNING FOR REDUCED OBSOLESCENCE

By J. F. Randall

In this article, the author, who is director of the Ford Motor Company manufacturing engineering office in Detroit, offers three practical suggestions which could be included in any program that is designed to combat obsolescence. A large number of illustrations supplement the text.

Page 102

TURNING PIPE ROLLS

At Beloit Eastern Corporation's new pipe roll shop in Downington, Pennsylvania, an unusual combination turning method is used for "skinning" large steel pipe rolls.

Page 114

MANUFACTURING THE CHRYSLER TORQUEFLITE TRANSMISSION

By Fred W. Vogel

With this installment, the editor of *Modern Machine Shop* concludes his discussion of the tools, dies, jigs, fixtures and facilities of the Kokomo, Indiana, plant of the Chrysler Corporation for mass producing automatic transmissions.

Page 116

TOOL ENGINEERING INCREASES CUTTER LIFE IN MILLING JIG BUSHING SLOTS

By A. W. Wike

Cooperative field engineering by Goddard & Goddard Company, Detroit milling cutter manufacturer, enables a jig producer to obtain 100 times more pieces per cutter in milling a radius lock screw slot in a fixed renewable jig bushing.

Page 128

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in this issue

JULY 1957 • VOL. 30 • No. 2

BORING AND CONTOURING FUEL NOZZLE PARTS

Precision cam boring machine setup provides for boring and contouring the inside diameters of parts for jet engine fuel nozzles.

Page 130

COMPLEX FORMING ON A PRESS BRAKE

By Gilbert C. Close

At Longren Aircraft Company, Torrance, California, sculptured airplane wing panels are given curves having continuously variable arcs progressing through several different metal thicknesses. For this operation, a 12-foot hydraulic press brake equipped with appropriate female die is used.

Page 136

MACHINING STAINLESS STEEL

By G. J. Stevens

In this case history, the author, who is a machining engineer for Armco Steel Corporation, points out how drill wear was greatly reduced in drilling hardened stainless steel shafts.

Page 142

HARD SURFACING WORN MILL ROLLS

Using a Unionmelt head, installed on each of two lathes, the Great Lakes Welding Company of Detroit, Michigan, quickly hard-surfaces such worn cylindrical parts as paper mill rolls and blooming mill table rolls—parts that would have to be scrapped unless rebuilt by hard-surfacing. One lathe handles parts up to 54 inches in diameter and 18 feet long, while the other lathe accommodates pieces up to 30 inches in diameter and 12 feet long.

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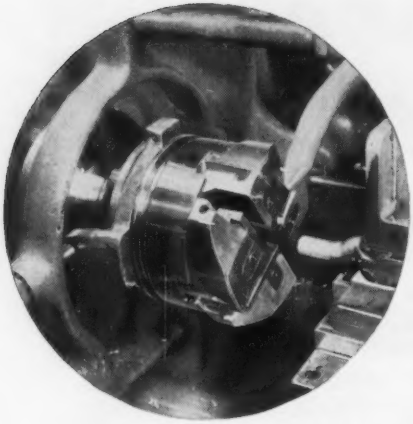
modern machine shop

in a fixed renewable jig bushing.

Page 128



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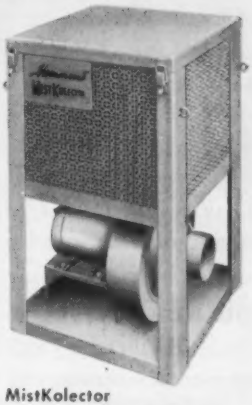

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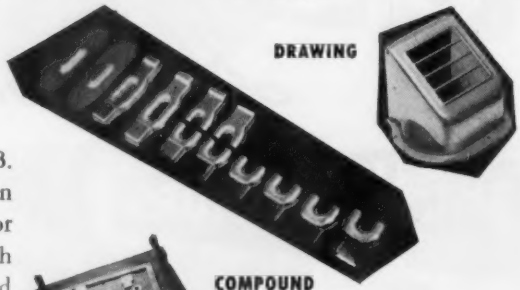

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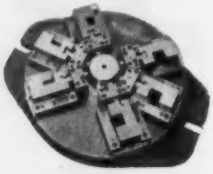

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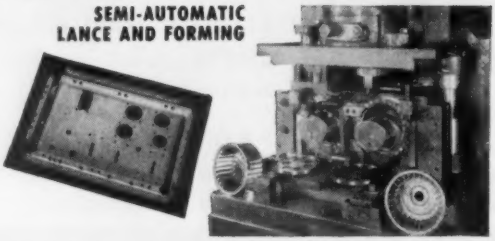

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Aram Kalenian, writer of the letter reproduced above, and president of Vee-Arc Corp., is shown with Ralph Rastad, superintendent, and Paul Daoust, operator, examining a chucking job run on their 3" Model AB Cleveland Dialmatic.

The parts shown (some are blanked out, others are machined complete) are typical of those produced on the Model AB 3" Cleveland Single Spindle Automatic at the Vee-Arc Corp. Diameters of these parts range from 5/8" to 4 1/4", and materials include aluminum, type 303 stainless, and tough, cold hobbing steel.

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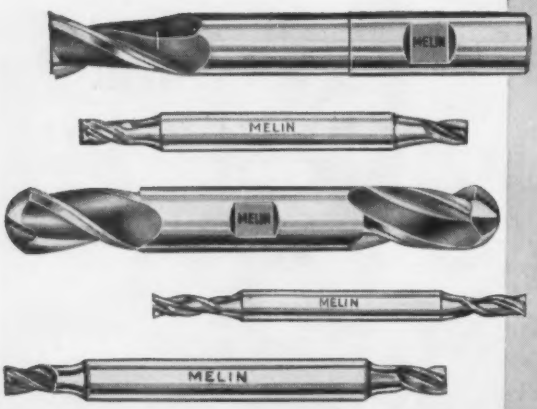

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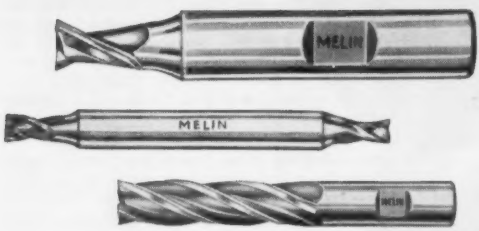

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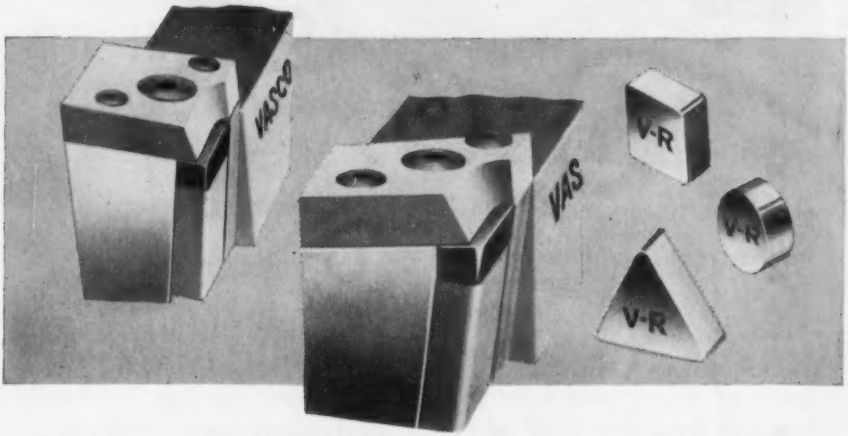

The high production and low cost of machining with carbides is practical even for the smallest plant when V-R toolholders with throw-away inserts are used. Tooling cost is low for these reasons:

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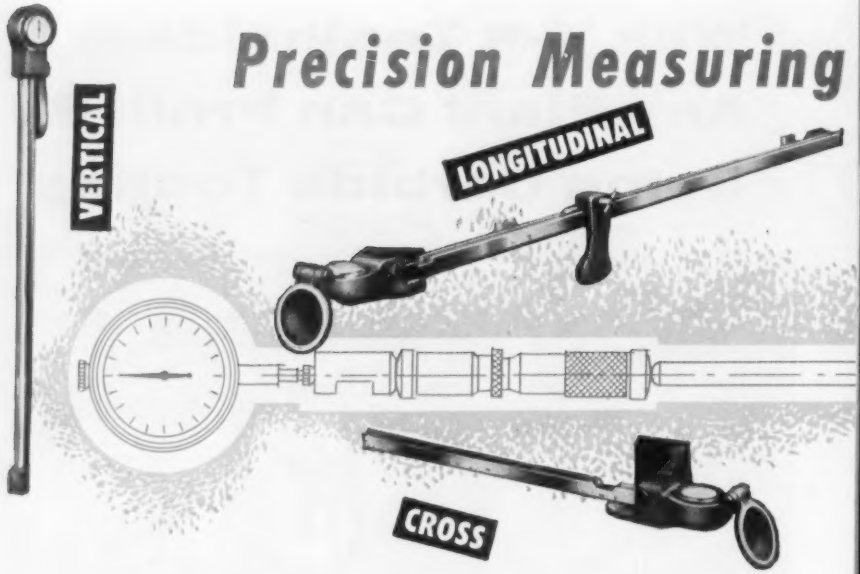
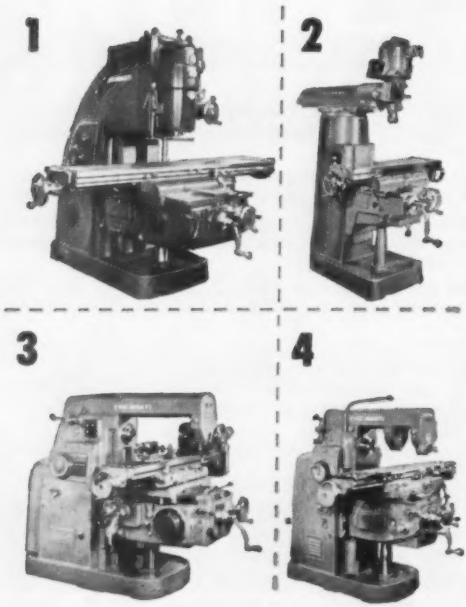
Precision Measuring





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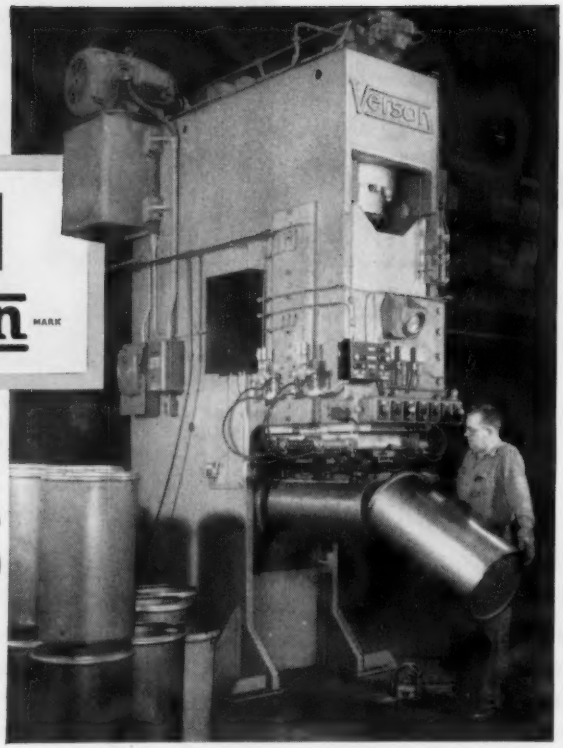

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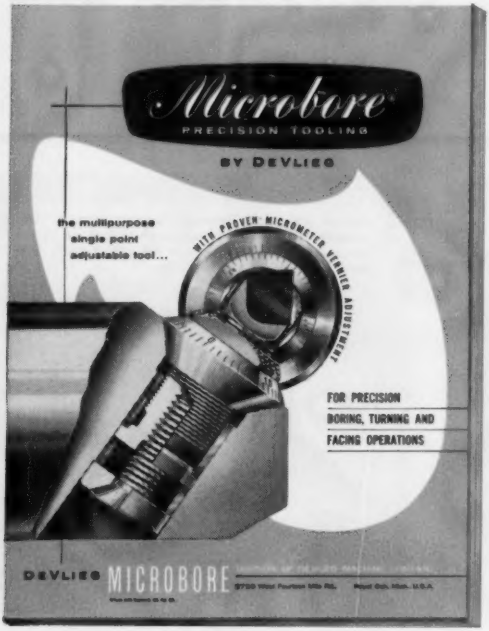

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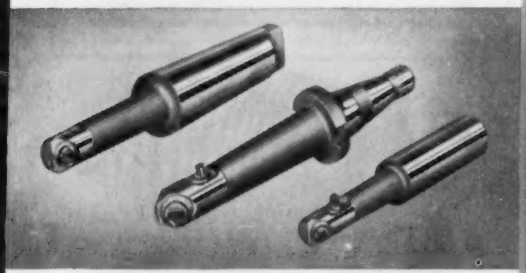

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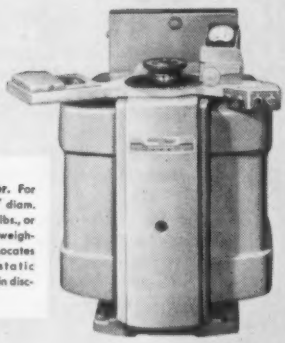

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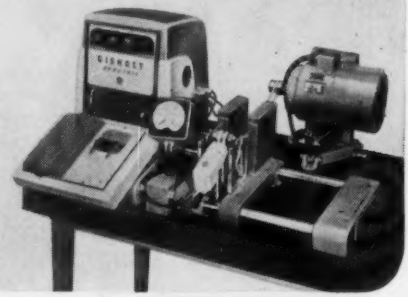

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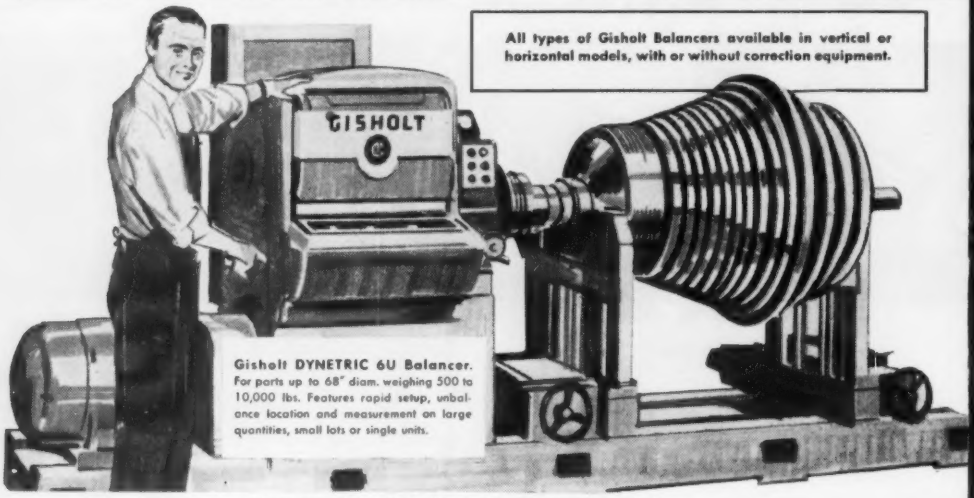

Gisholt DYNETRIC 6U Balancer. For parts up to 68" diam. weighing 500 to 10,000 lbs. Features rapid setup, unbalance location and measurement on large quantities, small lots or single units.

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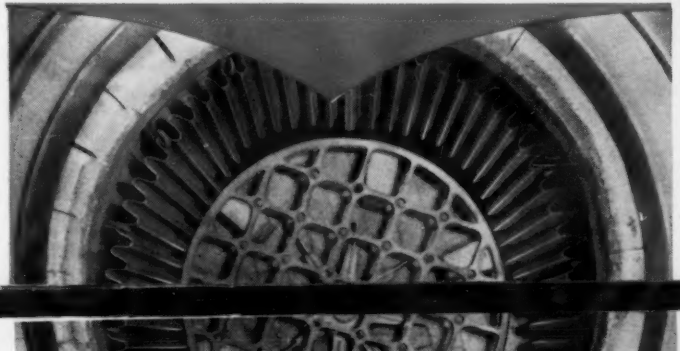
. . . JUST ANOTHER LINDBERG PIT-TYPE CARBURIZING FURNACE

BUT LOOK INSIDE

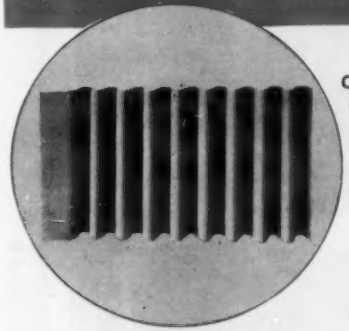


No Retort!

Because it needs no retort, this new Lindberg electric vertical pit-type furnace gives you these important advantages:

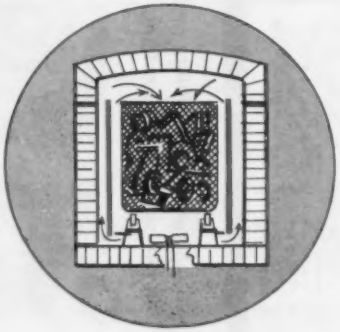
electric vertical pit-type furnace gives you these important advantages:

- **Lower initial cost, no retort to pay for.**
- **No expensive retort replacement.**
- **Downtime for retort replacement eliminated.**
- **Increased production because it heats faster.**
- **Exact atmosphere control maintains work quality.**
- **Versatile, carbon-diffusing and requenching along with carburizing. Adaptable to variety of work.**



CORRTHERM elements operate on extremely low voltage. No leakage through carbon saturation. Shock or short hazards eliminated. No complicated mountings required. An exclusive Lindberg development.

All this is made possible by Lindberg's new CORRTHERM electric heating element. For lower initial cost, lower maintenance costs, faster production, better quality control, why not look into this furnace. It's additional evidence that, if you're concerned with the application of heat to industry, better talk it over with Lindberg.



Note how **CORRTHERM** elements serve as baffles to direct forced convection streams through the charge.

LINDBERG

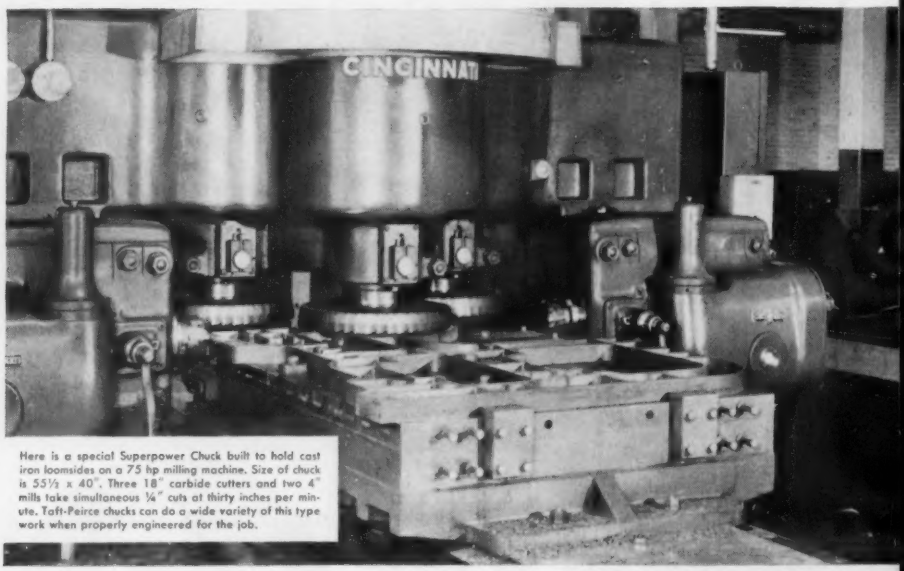
ENGINEERING COMPANY

2469 West Hubbard Street, Chicago 12, Illinois

Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.
Toronto Plant: EFCO-Lindberg, Ltd., 11 Front Street, East

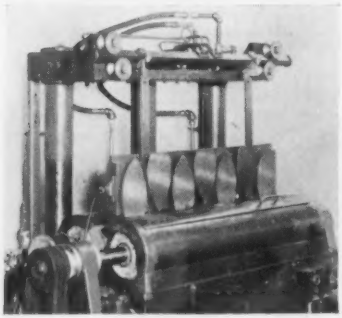
For more data circle **320** on Reader Service Card

Taft-Peirce Magnetic Chucks bring



Here is a special Superpower Chuck built to hold cast iron loomsides on a 75 hp milling machine. Size of chuck is 55½ x 40". Three 18" carbide cutters and two 4" mills take simultaneous ¼" cuts at thirty inches per minute. Taft-Peirce chucks can do a wide variety of this type work when properly engineered for the job.

Simplicity, flexibility make Superpower Chucks Versatile "Handymen" in milling, shaping, profiling, layout, inspection and holding odd-shaped work



A Taft-Peirce Superpower Electromagnetic chuck was artfully applied to put flat iron bases through a glazing machine. Both sides of the chuck are loaded, holding fourteen pieces at once — a greatly simplified arrangement.

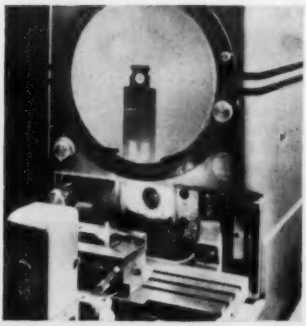
The art of magnetics is making magnetic chuck-held machining and inspection a new and intriguing source of cost and time savings throughout the plant.

To give you every possible opportunity to make use of these advances, Taft-Peirce offers the most complete line of magnetic chucks, work drivers and accessories available today. Here are just a few of the features you will find in the Superpower line . . .

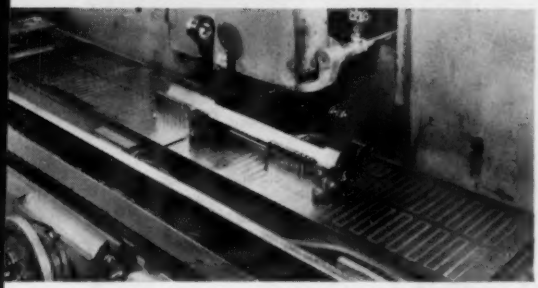
- Choice of Permanent or Electromagnetic types — allows complete freedom of selection for every application.
- Maximum useable power — scientific concentration of magnetic forces, more magnetic poles.
- Low heights, light weight — more working room, easier to use and handle.
- Extreme precision — rugged construction, skillful manufacture and careful assembly.

Look at Taft-Peirce Magnetic Chucks as a versatile device. The photographs here cover just a few of the many possibilities which you can use to develop new ideas. Special chucks for unusual holding applications are designed and built on order; and help in adaptation of standard sizes and types will be expertly provided. Write for Catalog No. 412 — a comprehensive story of magnetic chucking with data on complete Taft-Peirce line.

New Cost Savings to Workholding



A clever inspector is using this combination of a Taft-Peirce Permanent Magnet Chuck and Magnetic Parallel to hold parts for optical gaging. Chuck accuracy assures precision, and minimum residual magnetism allows rapid on-off handling.



Two 12" x 36" Superpower Magnetic Chucks are tandem mounted and used in conjunction with magnetic V-Blocks to handle this piece on a 72" surface grinder.

Grinding simple and compound angles becomes very easy and precise when you use Taft-Peirce Magnetic Angle Plates. This compound angle is being ground on a No. 9866-2.

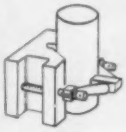
Tips

and IDEAS on MAGNETIC CHUCKING

Grinding Keyway or Slot

Here is an easy method to grind a keyway or slot, particularly on irregular or odd-shaped workpieces. Use Superpower chuck as base, set up work on standard V Blocks and grind as required. Will hold to precision tolerances.

This adjustable dummy arrangement is a convenient way to set wheel height for finishing to a given dimension. Mount dummy in V Block, clamp it to required height and apply layout dye. Touch wheel to top of dummy.



Adjustable Dummy or Size Block

Holding Non-Ferrous Parts

Parts made of non-ferrous material can be held on magnetic chucks by utilizing apertures or openings where the workpiece will be resting on chuck faceplate. Steel slugs inserted through these holes will give firm holding power for most grinding operations.

T-P

TAKE IT TO TAFT-PEIRCE

THE TAFT-PEIRCE MANUFACTURING CO.
WOONSOCKET, R. I.

T-P Means TOP Precision

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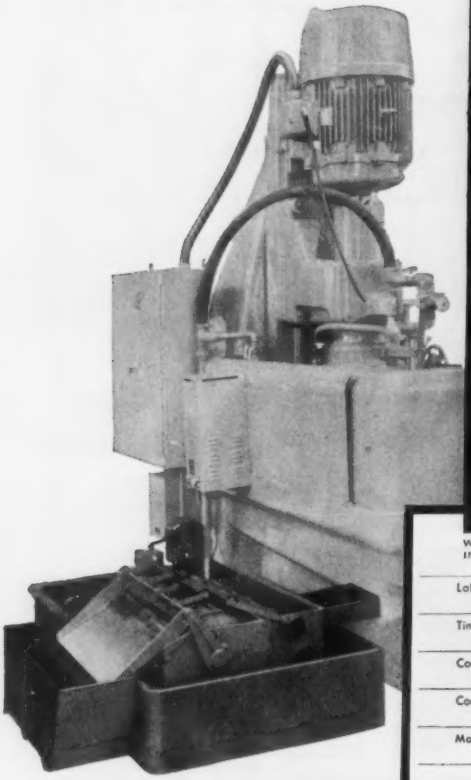
BARNESDRIL

magnetic separator saves $152.50 weekly

...on grinding operations



An Eastern manufacturer installed a BarnesdriL Magnetic Separator on a Hanchett Grinder. After the separator had been in operation approximately a year, they compared grinding costs against the costs previous to the separator installation. These figures showed a weekly savings of $152.50.* The installation cost was returned in savings in less than 6 weeks.

All coolant from the grinder continuously recirculates around the drum of powerful permanent Alinco Magnets in the separator. Swarf, chips, and other ferrous particles are removed resulting in the decreased grinding costs shown. Not shown, but important factors are, the decrease of dermatitis and improved finish of ground parts.

For complete information about BarnesdriL Magnetic Separators, call your BarnesdriL Representative or write for Bulletin No. 300E.

WEEKLY COST COMPARISON BEFORE AND AFTER INSTALLING A BARNESDRIL MAGNETIC SEPARATOR

	Before	After
Labor Consumed Cleaning Coolant System @ $1.00 per hr.	$ 12.00	$ 2.00
Time Post by Machine Operator @ $1.50 per hr.	18.00	3.00
Coolant Compound Used @ $1.50 per gal.	21.00	4.50
Cost of Wheel prorated weekly	37.50	26.50
Machine downtime @ $10.00 per hr.	120.00	20.00
Totals	$208.50	$66.00
Total Weekly Savings		**$152.50**

50th year

BARNES DRILL CO.

860 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 3419 South Telegraph Road

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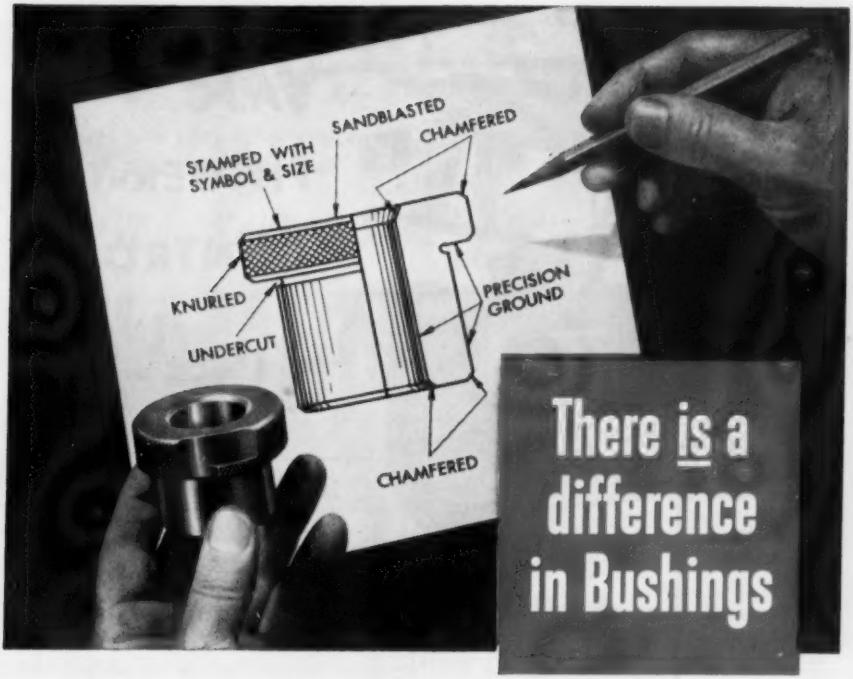

And here's what it means to you!

Recent tests in drilling 16,300 holes show that there is a difference in bushings. In these tests Ex-Cell-O Bushings lasted twice as long as competitive makes.

These differences make Ex-Cell-O a leader: (1) High chrome, high carbon oil-hardening bearing steel, (2) uniform heat treating to 62-64 Rockwell "C". (3) Precision grinding of inside and outside diameters and under the head for perfect seating. (4) Ex-Cell-O's own standards for precision, tougher than A.S.A. standards.

Large inventories in Detroit, New York, Downey, Cal., Lima, Ohio, and London, Canada, keep your inventory down. You get immediate shipment.

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EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

EX-CELL-O FOR PRECISION
XLO

57-94

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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MODEL
RC-250

SAJO FINGER-TIP CONTROL

REDUCES CUTTING COSTS

SAJO's 10" x 10" Production Hacksaw features unique patented finger-tip controlled cutting pressures assuring peak cutting efficiency plus longer saw blade life.

SAJO world famous workmanship is typified in this Model RC 250 Hacksaw. Its design and foolproof hydraulic system assure easy, trouble-free operation.

Also available—SAJO Utility Hacksaws; Model RC 30— 6" x 6", and RC 230—9" x 9".

BUILT BY SWEDISH CRAFTSMEN TO U.S. STANDARDS.
ALL SAJO EQUIPMENT IS MODESTLY PRICED.

Parts and service overnight from most major cities.

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HORIZONTAL AND VERTICAL MILLERS AND SHAPERS

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It pays to figure all your needs and order now . . . while our prices are pared down for inventory. Our diamonds are all whole natural stones of good commercial quality and meet all shop requirements. Take advantage of these savings.

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1½	~~$60.00~~	$17.00
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2½	~~$110.00~~	$29.75
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All tools supplied in 7/16" x 3" holders (standard size) unless otherwise specified. Other holder sizes can be supplied for an additional 75c each.

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H LES JIG GROUND with *Vulcanaire*

Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.

A five station indexing fixture from Vulcan's Contract Tool Room (Your tool room in Dayton). Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result—eliminated all close locating and dowelling of indivdiual parts and of course hours of time.

Borrow our instructive 11 minute movie on Jig Grinding.

*Vulcanaire equipment pays for itself on the first job.

Services { *ENGINEERING . . . PROCESSING . . . BUILDING . . . SPECIAL MACHINES . . . VULCANAIRE JIG GRINDERS . . . MOTORIZED ROTARY TABLES, BREHM SHIMMY AND RELATED DIES.*

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VULCAN tools

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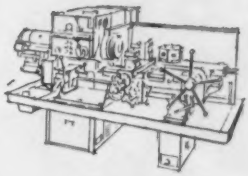
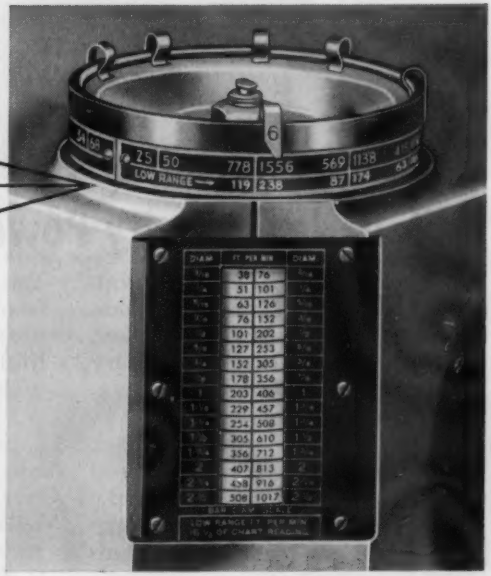


If you

were a turret lathe operator today, wouldn't **you** want to work at a machine with this easy method of preselection?



Only Warner & Swasey offers this direct-reading speed selector calibrated in work diameter, surface feet, and spindle rpm's—thus, no slide rules or conversion charts are required to determine proper spindle speeds. Movable number clips indicate at a glance your job's sequence of speed changes.

Ask your Warner & Swasey Field Engineer about this exclusive feature

WARNER & SWASEY
Cleveland
PRECISION-MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

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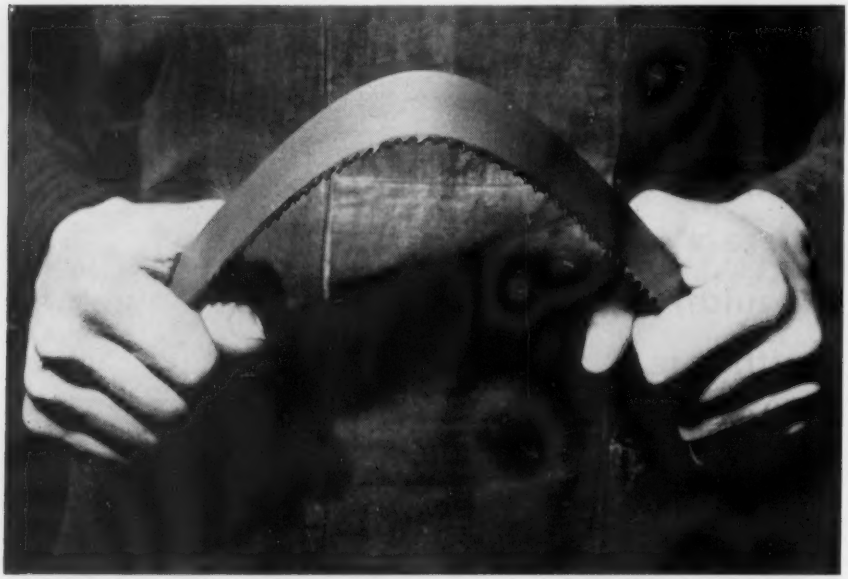

THIS is No Ordinary Power Hack Saw Blade

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade —the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge.

With a MARVEL Blade, you can cut any material—from the free machining steels to the toughest alloys . . . fast, accurately and economically. You can tension a MARVEL Blade from 200% to 300% tauter than any ordinary blade, permitting much higher speeds and heavier feeds without deflection or breakage.

Like all good things, attempted copies of the MARVEL Blade have been numerous, but its performance has been *unequalled* by any of the imitators. Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

Write for latest cutting tool Bulletin and the name of your nearest MARVEL *Distributor.* FB-1020

Metal Cutting
MARVEL SAWS
Better Machines-Better Blades

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Switch to lowest-cost parts duplication with

CINCINNATI HYDRAGUIDE TRACER LATHES

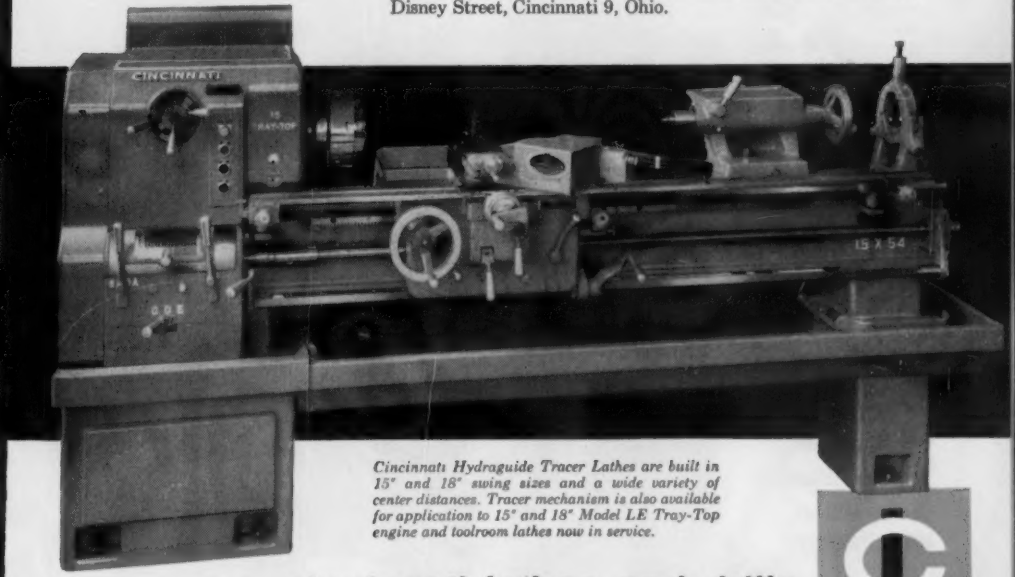
"Head of the Class" Engineering—

Compact design provides shortest hydraulic linkage for more sensitive control . . . requires no additional floor space. Tool is accurately guided by sensitive stylus following the easily-accessible flat template. Automatic duplication . . . less operator attention . . . lowest tooling cost . . . minimum tool setting . . . less scrap . . . lowered cost per piece!

Just push this button to provide lowest-cost tracer machining on these new Cincinnati Hydraguides® . . . yet there is no interference with standard lathe operation. Everything is on the carriage, but nothing is in the way. All controls, template and tool are on the operating side for maximum convenience.

All the proven Tray-Top features are included, of course . . . PLUS an increase to 5 HP for even greater performance. Here is NEW versatility . . . NEW convenience . . . NEW profit possibilities. And it's *still* an ECONOMY-PRICED lathe!

Ask your C L & T Dealer for the Hydraguide story. Write today for full data—catalog H-150. Cincinnati Lathe and Tool Co., 3207 Disney Street, Cincinnati 9, Ohio.



Cincinnati Hydraguide Tracer Lathes are built in 15" and 18" swing sizes and a wide variety of center distances. Tracer mechanism is also available for application to 15" and 18" Model LE Tray-Top engine and toolroom lathes now in service.

center on **cincinnati lathes and drills**

ENGINE, TOOLROOM, TRACER AND FIXED GAP BED LATHES AND A COMPLETE LINE OF DRILLING MACHINES

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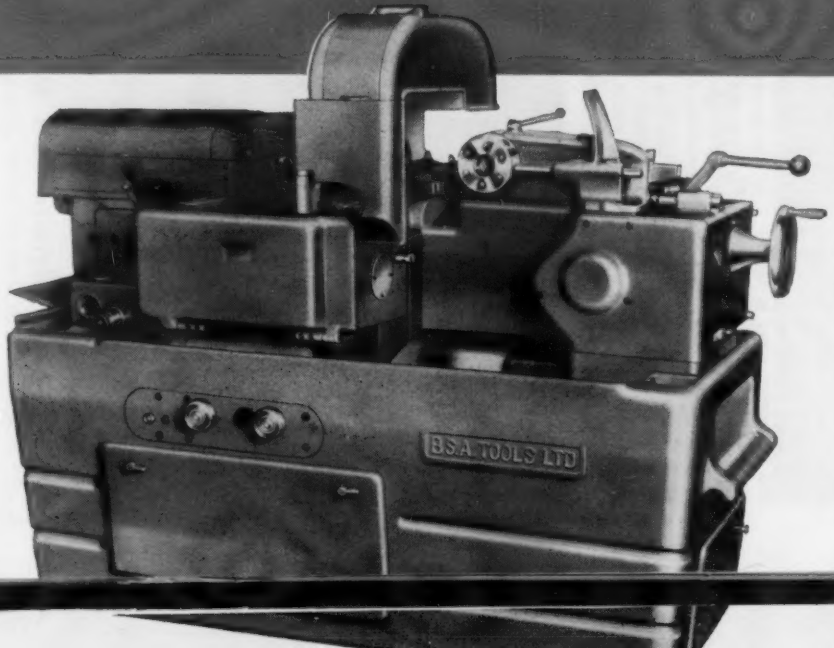
BSA first to provide UNIT REPLACEMENT of parts subjected to most wear

to keep important production flowing with new machine performance



With speeds, machining accuracy, ease of tooling and operation and maintenance equal or superior to any machine in its classification, BSA Single Spindle Automatic Screw Machines offer a very definite plus value through "*unit construction and replacement*" of work spindles, side slides, turrets and gear boxes.

Unit construction, plus extremely rigid, one-piece machine frame makes it possible to bring BSA machines back to factory standards of perfection quickly. You place an important unit back in the line with a

Shipment of replacement parts are

standards of perfection quickly. You place an important unit back in the line with a

Shipment of replacement parts are speeded to you from National Acme, in Cleveland. Here, also, full engineering and design services as well as demonstration and service facilities, in the National Acme tradition, are available to you.

May we explain how "*unit construction and replacement*" can ease your production problems?

Additional Production Advantages of BSA

FIVE STANDARD CAPACITIES: ½" ¾", 1", 1⅝", and 2".

WIDE RANGE OF SPINDLE SPEEDS—200 to 6000 on ½" machine, 69 to 1260 on 2" model.

Cams, change gears and tooling easily accessible FOR QUICK JOB-TO-JOB CHANGEOVER.

Unit construction provides quick access for EASY MAINTENANCE.

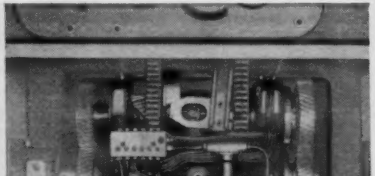
Special spindle mounting, DESIGNED TO REDUCE WEAR.

Positive chain drive from gear box to spindle PREVENTS SLIPPAGE.

All models use STANDARD AMERICAN TOOLING

UNIT CONSTRUCTION SPEEDS REMOVAL OR REPLACEMENT

Work Spindle



Gear Box

Side Slides and Turret

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National Acme

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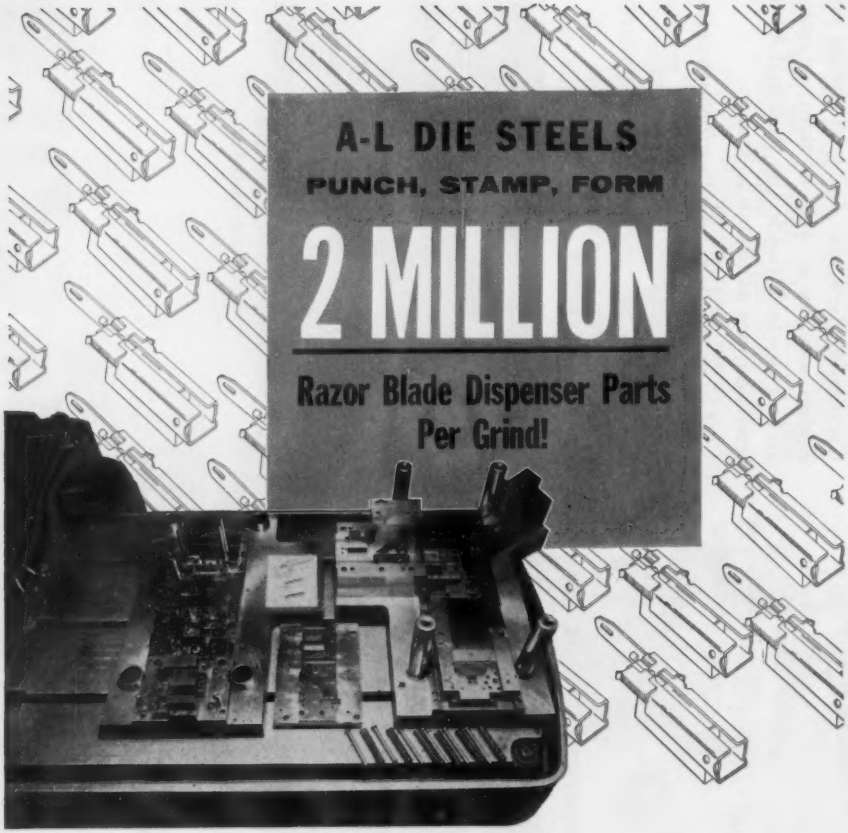

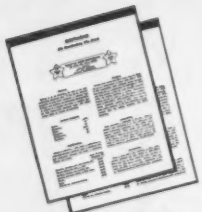

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DEWARD & ONTARIO BLUE SHEETS

These 4-page folders contain complete information on forging, annealing, tempering, etc., and detailed laboratory data on physical characteristics of A-L Deward and Ontario. *Ask for your free copy.*

Address Dept. MS-91

Punching, stamping and forming parts of this die are of air-hardening Allegheny Ludlum ONTARIO—heat treated to 61-62 Rockwell C. Slides, frames and cams are of A-L DEWARD oil-hardening die steel —heat treated to 61-62 Rockwell C.

Ontario sections were pre-heated to 1250 F, then heated to 1850 F, held at 1850 F for about an hour and a half, then quenched in still air to room temperature. Finally they were drawn at 350 F for about three hours.

Deward sections (slides, frames and cams), were pre-heated to about 1200 F, then raised to 1420 F. As soon as they were uniformly heated and equalized with the furnace temperature, they were quenched in warm oil. Sections were then tempered for two hours at 325 F.

Thus, two superior A-L steels combine to solve an intricate production problem. You, too, may have an application that will benefit from a better selection of tool or die steels. For complete information, call your nearest A-L distributor or representative today, or write ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh, Pennsylvania.***

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call

Allegheny Ludlum

WAW 6021

AL® FINE TOOL STEELS SINCE 1854

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Products Manufactured_____ Number of Plant Employees_____

modern machine shop
431 Main Street
Cincinnati 2, Ohio

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

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ADVERTISEMENTS

301—Front Cover					435	465	495	525	555	585	615	645	675	705	735	765	795			
302—Inside Front Cover					436	466	496	526	556	586	616	646	676	706	736	766	796			
303—Inside Back Cover					437	467	497	527	557	587	617	647	677	707	737	767	797			
304—Back Cover					438	468	498	528	558	588	618	648	678	708	738	768	798			
305	331	357	383	409	439	469	499	529	559	589	619	649	679	709	739	769	799			
306	332	358	384	410	440	470	500	530	560	590	620	650	680	710	740	770	800			
307	333	359	385	411	441	471	501	531	561	591	621	651	681	711	741	771	801			
308	334	360	386	412	442	472	502	532	562	592	622	652	682	712	742	772	802			
309	335	361	387	413	443	473	503	533	563	593	623	653	683	713	743	773	803			
310	336	362	388	414	444	474	504	534	564	594	624	654	684	714	744	774	804			
311	337	363	389	415	445	475	505	535	565	595	625	655	685	715	745	775	805			
312	338	364	390	416	446	476	506	536	566	596	626	656	686	716	746	776	806			
313	339	365	391	417	447	477	507	537	567	597	627	657	687	717	747	777	807			
314	340	366	392	418	448	478	508	538	568	598	628	658	688	718	748	778	808			
315	341	367	393	419	449	479	509	539	569	599	629	659	689	719	749	779	809			
316	342	368	394	420	450	480	510	540	570	600	630	660	690	720	750	780	810			
317	343	369	395	421	451	481	511	541	571	601	631	661	691	721	751	781	811			
318	344	370	396	422	452	482	512	542	572	602	632	662	692	722	752	782	812			
319	345	371	397	423	453	483	513	543	573	603	633	663	693	723	753	783	813			
320	346	372	398	424	454	484	514	544	574	604	634	664	694	724	754	784	814			
321	347	373	399	425	455	485	515	545	575	605	635	665	695	725	755	785	815			
322	348	374	400	426	456	486	516	546	576	606	636	666	696	726	756	786	816			
323	349	375	401	427	457	487	517	547	577	607	637	667	697	727	757	787	817			
324	350	376	402	428	458	488	518	548	578	608	638	668	698	728	758	788	818			
325	351	377	403	429	459	489	519	549	579	609	639	669	699	729	759	789	819			
326	352	378	404	430	460	490	520	550	580	610	640	670	700	730	760	790	820			
327	353	379	405	431	461	491	521	551	581	611	641	671	701	731	761	791	821			
328	354	380	406	432	462	492	522	552	582	612	642	672	702	732	762	792	822			
329	355	381	407	433	463	493	523	553	583	613	643	673	703	733	763	793	823			
330	356	382	408	434	464	494	524	554	584	614	644	674	704	734	764	794	824			

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OR LESS
FOR LATHES, GRINDERS
PERFECTION LIVE CENTERS
SPINDLE TYPE
*GUARANTEED 2000 HOURS OR 1 YEAR

SIMPLE DESIGN:
Only six parts. One-piece main body serves as cup for roller bearing on which spindle turns. Allows much greater capacity bearing in same size body.

AUTOMATICALLY ADJUSTS FOR WEAR:
End thrust from work keeps tapered roller bearing perfectly seated—bearing cone and inner race of ball bearing are pressed on spindle; outer race is a light press fit into main body.

ABSOLUTE CONCENTRICITY AND ALIGNMENT FOR BEARINGS:
Both conical and cylindrical bores of body are ground at same setting in work head. Point is ground under load in its own bearings to insure running dead true.

TAPERS AVAILABLE				
MORSE	JARNO	B & S	NORTON	LANDIS
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J & S TOOL CO., INC.
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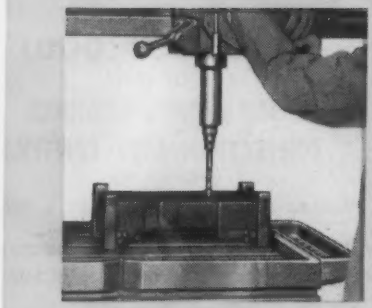
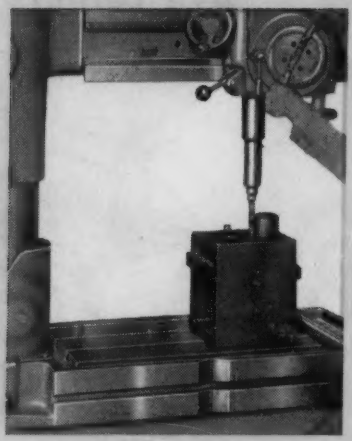


SMALL WORK



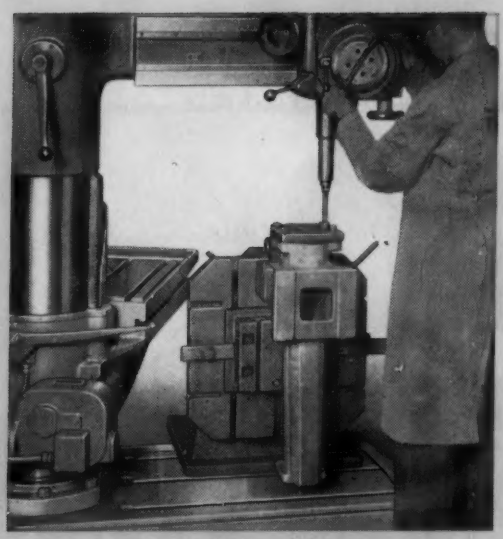
BIGGER...

FOSDICK SENSITIVE RADIAL DRILLS

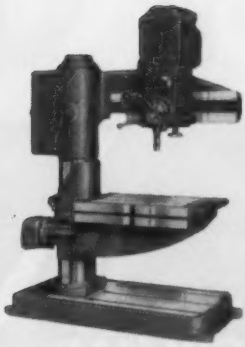
sensitive to your

We put a table on the radial to give you two machines in one—and a work size versatility that is unmatched in any drilling machine of comparable price and size!

Actually, the Fosdick Sensitive Radial combines the best features of two proven, reliable designs. The capacity and flexibility of a radial—the rigidity, compactness and convenience of an upright. For job shop work or production, it's the answer to useful capacity in limited floor space. Economically priced, too! The economy of first cost is second only to the economy of use.



STILL BIGGER



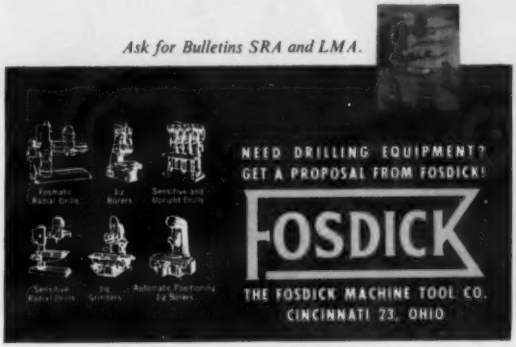
ALL THESE WORK SIZES ON ONE MACHINE—
The Fosdick Sensitive Radial Drill. Also available as a Layout Machine, which combines high precision compound table with sensitive radial drill.

work size problem...and your pocketbook

The arm of the Sensitive Radial swings 360° on the rigid one-piece column. Controls are always at the same convenient height. Work is placed on the adjustable table, or on the base with the table swung out of the way. Drills up to 2″ in cast iron. 12″ column, 3′ or 4′ arm, nine speeds (ranges from 60-1200 to 175-3500 rpm), four feeds (.004-.020 or .002-.010), 3 hp motor, reversing motor control for tapping.

Write today for complete information on the Fosdick Sensitive Radial Drill.

Ask for Bulletins SRA and LMA.



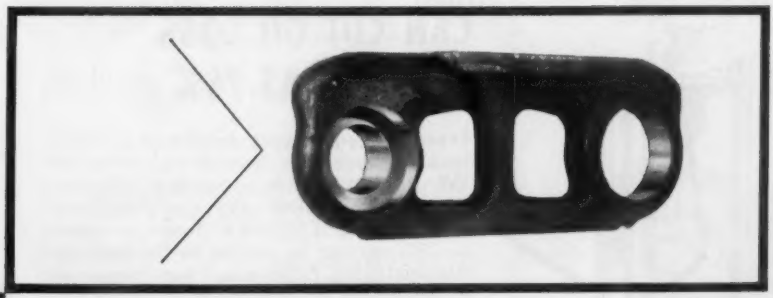
CATERPILLAR

proves...

good reamer design helps hold size

and

tool life in tough materials



Caterpillar Tractor Co. finish reams 2 holes in these tough forged steel track links with the required surface finish and a production rate of 102 pieces per hour from each machine. Previous operations include core drill and rough ream the large hole, and core drill and counterbore the small hole. Four hundred pieces are obtained per sharpening in this tough, hard material. Finish reaming is used because it is the only means available which will produce the required finish and meet the high production requirements of this job.

these are the job facts:

Bore Size	2.605"	1.738"
Stock Reamed	.025"	.025"
Cutting Speed	75 rpm.	100 rpm.
Production	102 per hr.	102 per hr.
Feed	.011" per rev.	.013" per rev.

These Barber-Colman reamers were specially designed to suit the requirements of this part. The design of the reamer body provides maximum backing for the cutting edge and a large chip space in front of the blades to insure good chip flow

The direction and angle of spiral are designed to provide the most efficient cutting action in this material. The reamer body is specially heat treated for toughness. These reamers are sharpened with a positive primary clearance. The nose form includes a chamfer, lead, and straight portion which are specifically designed for the job. Behind the nose, a back taper provides adequate clearance in the finished hole. These elements of the profile are accurately maintained by cam-controlled sharpening on the Barber-Colman Combination Sharpening Machine.

When you have hole finishing problems involving accuracy, finish, tool life and production requirements, call a Barber-Colman reaming expert and talk over with him the most economical way to get the results you want.

BARBER-COLMAN COMPANY

9 6 7 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

BARBER COLMAN

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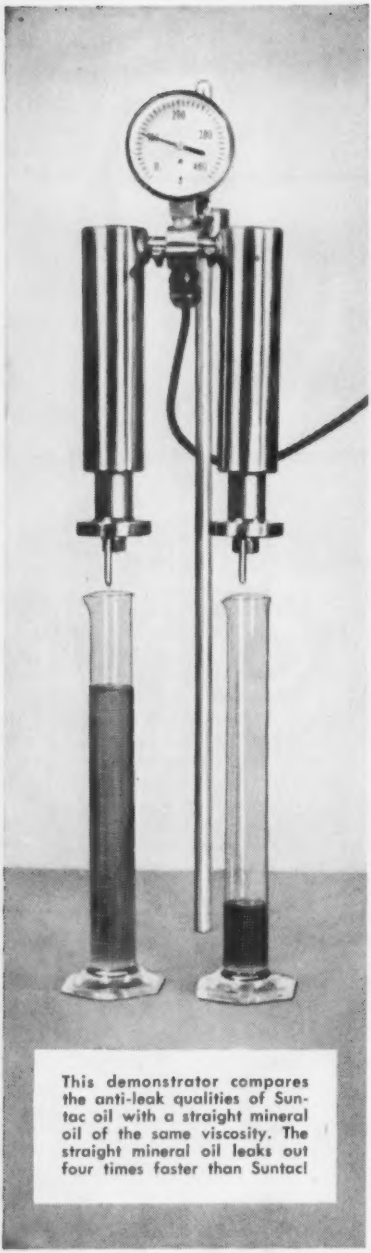

This demonstrator compares the anti-leak qualities of Suntac oil with a straight mineral oil of the same viscosity. The straight mineral oil leaks out four times faster than Suntac!

LEAKAGE DEMONSTRATOR PROVES SUNTAC CAN CUT OIL LOSS AS MUCH AS 75%

Expensive equipment overhauls to stop leaks in hydraulic systems can often be avoided by a change to Suntac®. The exceptional antileak characteristics of Suntac oils can reduce oil losses as much as 75%, as can be proved in the leakage demonstrator. *Some users have reported actual drops in oil leakage of 90%.*

Suntac oils give you lower lubrication costs, cleaner equipment and floors, safer working conditions. Their leak-reducing agent leaves no gummy film or residue. In addition, Suntac oils are fortified against oxidation to lengthen oil life... against rust and corrosion to lengthen equipment life.

You'll find Suntac a money and time saver in your hydraulic systems... and a high-quality general-purpose oil for many other uses.

WANT MORE SUNTAC FACTS?
Ask your Sun representative for full details, prices, and delivery information, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-7.

SUNOCO

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INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

Philadelphia 3, Pa.

In Canada: Sun Oil Co. Limited, Toronto and Montreal

For more data circle 339 on Reader Service Card

CLEEREMAN

"Series A" *Automatic* Drilling and Tapping Machines

producing faster... better... easier... from coast to coast!

Hartford, Conn.
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Midland Park, N. J.
Marlow Pumps Division

Reading, Pa.
Textile Machine Works

Syracuse, N. Y.
Carrier Corporation

Cortland, N. Y.
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Ohio Brass Co.

Cleveland, Ohio
Eaton Mfg. Co.

Cleveland, Ohio
Fawick Corporation

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Eaton Mfg. Co.

Highland Park, Mich.
Ford Motor Co.

Jackson, Mich.
Calvin Machine Products, Inc.

Saginaw, Mich.
Saginaw Steering Gear Division, General Motors Corporation

Chicago, Ill.
Ford Motor Co., Aircraft Engine Division

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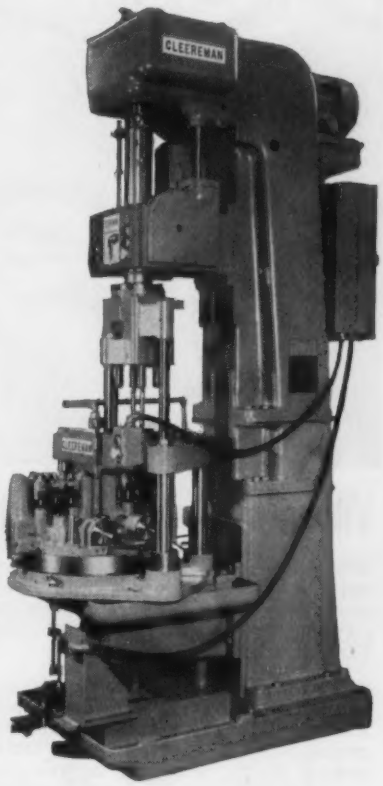

These are a few of the Cleereman "Series A" users who find this "box cycle" automatic Drilling and Tapping Machine the answer to their problems.

Drilling and tapping a hole "at the touch of a button" produces faster, easier and at highest profits. Operators are relieved of handling cumbersome controls. Operator morale is boosted and operator fatigue reduced.

Join the rapidly increasing Cleereman "Series A" users list. This fast set-up production-type drilling and tapping machine has a place in your plant. Don't delay increasing your production efficiency. *Wire, write* or *phone* about your jobs right now.

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CLEEREMAN MACHINE TOOL CORP.
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For more data circle **340** on Reader Service Card

Vibration won't loosen FLEXLOC self-locking nuts

Where products must be reliable . . . must stand up under vibration, temperature extremes and hard use . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts.

Here's why. FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting locking action. And they are reusable: repeated removal and replacement, frequent adjustments, even rough screw threads will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes, types and materials to meet the most critical locknut requirements. Your local industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

STANDARD PRESSED STEEL CO.

FLEXLOC® LOCKNUT DIVISION **SPS**

JENKINTOWN PENNSYLVANIA

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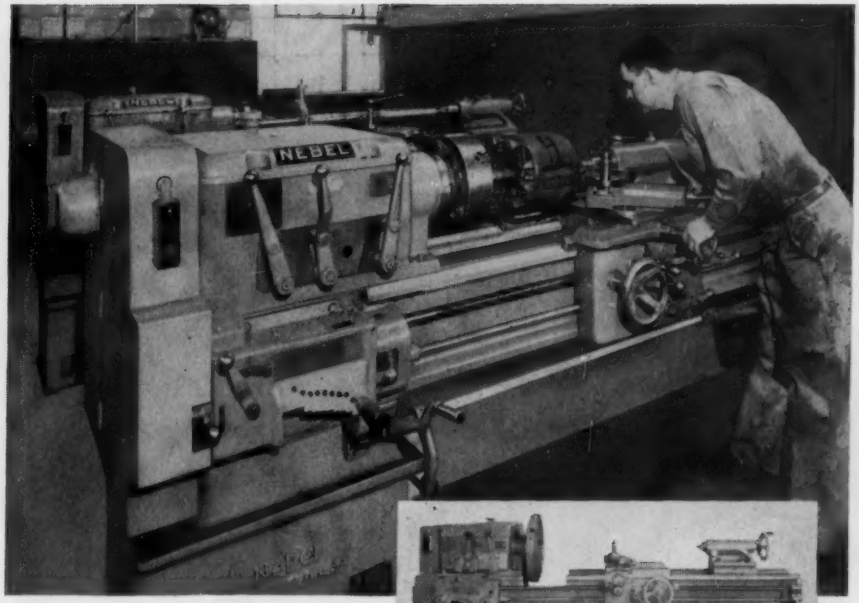
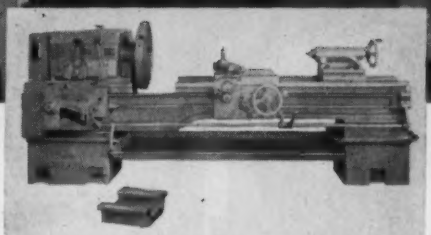


Removable block gap lathes Give you flexible swing capacity . . . plus all the advantages of a standard lathe. Made in three sizes. LA 16"/27" and 20"/30" (right); also D 25"/40"



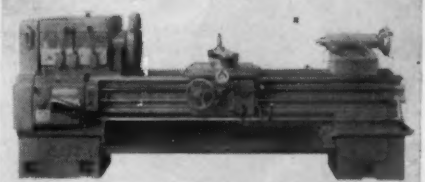
"this Nebel pair reduced machining time 1/3"

Fred R. Emberger, Plant Engineer, Continental Can Co. Shellmar-Betner Division, Devon, Pa.

"Our two Nebel Lathes—LA 20"/30" removable block gap and LA 20" standard—have reduced lathe machining time by 33⅓ percent. They have eliminated the need for carrying a big inventory of spare parts. These Nebel lathes give more power and stability, and insure greater accuracy than we could obtain with conventional lathes."

Mr. Emberger states further: "In our shop the most important maintenance equipment is the lathe. That's why we chose Nebel."

This confidence is reflected wherever you find Nebel lathes—and that's wherever accurate, economical maintenance and production turning facilities are required. For further information, write for descriptive bulletins. Nebel Lathe Division, Nebel Machine Tool Corp., 3409-A Central Parkway, Cincinnati 25, Ohio.



Standard lathes Six sizes: 16" and 20" (above); also 25", 27", 32" and 36". Nebel also manufactures extension bed gap lathes: AG 20"/40" medium duty, G 28"/50" heavy duty and XB 20"/40" heavy duty.

New LA Bulletin describing the gap and standard lathes mentioned above. Send for your free copy today.

Nebel
LATHES
CINCINNATI

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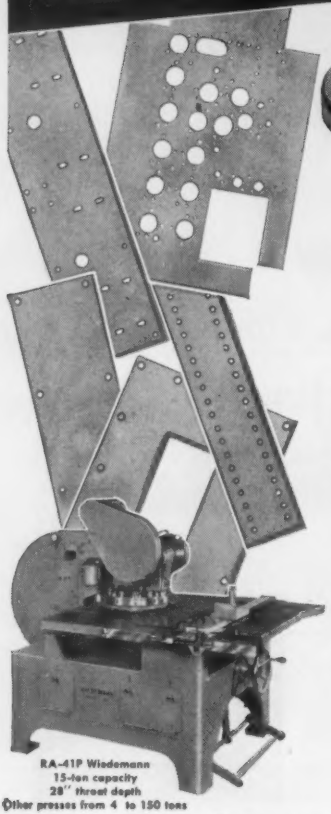
Versatile WIEDEMANN TOOLING *Saves You Money*



RA-41P Wiedemann
15-ton capacity
28" throat depth
Other presses from 4 to 150 tons

6 typical jobs—total cost of tools shown . . . $194.80! That's just the first of many cost-saving advantages of piercing short run jobs with a Wiedemann Turret Punch Press.

Hundreds of Wiedemann users report 60% to 90% direct savings in production of chassis, panels, side rails, etc. —and engineering changes are reduced to a matter of minutes.

Wiedemann Turret Punch Presses require only one punch and die of a size . . . rounds, squares, louvers, groups, extrusions . . . from 0.093" dia. to 7" square and each is ready for use . . . larger openings and notches are produced easily with a series of "hits". Here is real low-cost tooling flexibility.

Why not prove to yourself how much more you could produce for *less* with a Wiedemann. We'll be glad to make a time study of your work. Just send prints and ask for Bulletin 201.

There's a Wiedemann for every short run piercing requirement.

WIEDEMANN MACHINE COMPANY

4219 Wissahickon Ave. • Philadelphia 32, Pa.

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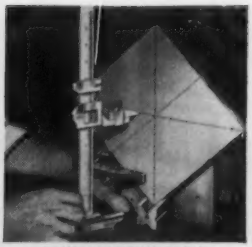

HAND MEASURING TOOLS AND PRECISION INSTRUMENTS
The name Starrett on a tool guarantees accuracy, fine workmanship and complete dependability.

DIAL INDICATORS AND GAGES
Standard for quality and dependability—a complete line for every gaging or production inspection application.

HACKSAWS, BAND SAWS, BAND KNIVES
Precision made and production proved for top performance, uniformity and maximum cutting economy.

PRECISION GROUND DIE STOCK AND FLAT STOCK
Now over 1000 sizes — air, oil, oil and water and water hardening types. "Just lay it out and saw it out."

surest thing in measuring—

There's never an argument when it comes to precision measuring tools. Just specify STARRETT and you'll please everyone in the shop — from the tool crib supervisor to the rawest apprentice.

But why stop with measuring tools when there are so many opportunities to get the same quality and dependability in so many other Starrett products? Did you know, for example, that Starrett makes the world's most complete line of dial indicators and dial gages? Or that Starrett is among the largest producers of hacksaws, hole saws, band saws and band knives? Or that Starrett makes precision ground die and flat stock in over 1000 sizes?

Your Industrial Supply Distributor stocks the complete Starrett line. He can give you prompt, dependable service to match the quality and dependability of Starrett products. It pays in so many ways to specify *Starrett.*

NEW CATALOG No. 27

Shows the complete Starrett line. Ask your Industrial Supply Distributor or write for free copy. Address Dept. MD, The L. S. Starrett Company, Athol, Massachusetts, U. S. A.

Starrett

SINCE 1880
WORLD'S GREATEST TOOLMAKERS

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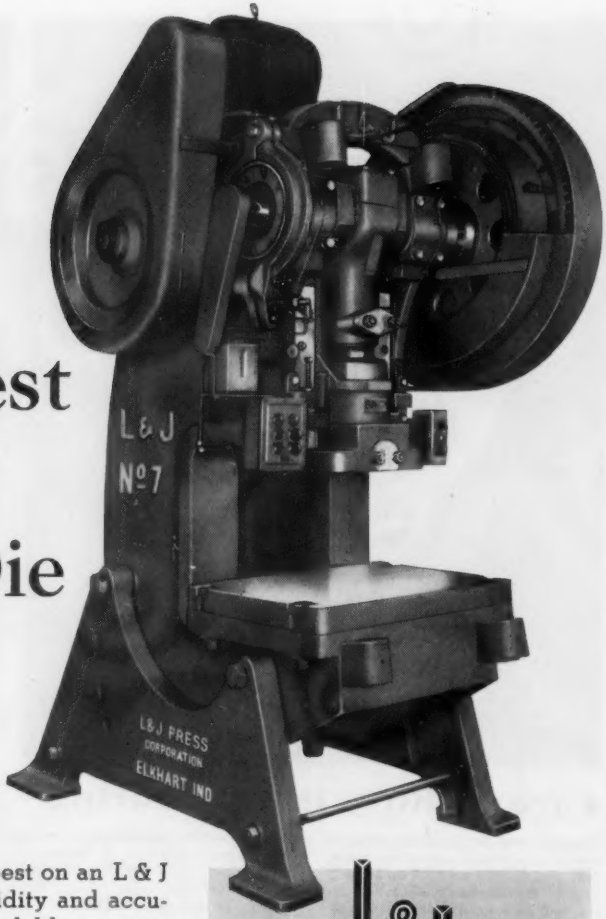
Gets the Best out of Any Die



Any die will do its best on an L & J No. 7 Press. The rigidity and accuracy of these dependable presses provide accurate die alignment that minimizes wear, and insures precision stampings. They also enable dies to produce maximum output for these presses are efficient, versatile and require but minimum maintenance. Write for complete catalog—24 O.B.I. Presses, 14 to 90 tons—20 to 100 ton Straight Side Presses.

NO. 7 L&J PRESS

Capacity—75 tons. **Stroke**—4", special max.—8". **Speed**—42 s.p.m. (85 s.p.m., non-geared). **Throat Depth**—13½". **Die Space**, standard—14", special max.—23". **Bolster Plate**—36" x 26" x 3". Also, non-geared. Air clutch optional.

L & J PRESS CORPORATION 1624 STERLING AVE. ELKHART, INDIANA

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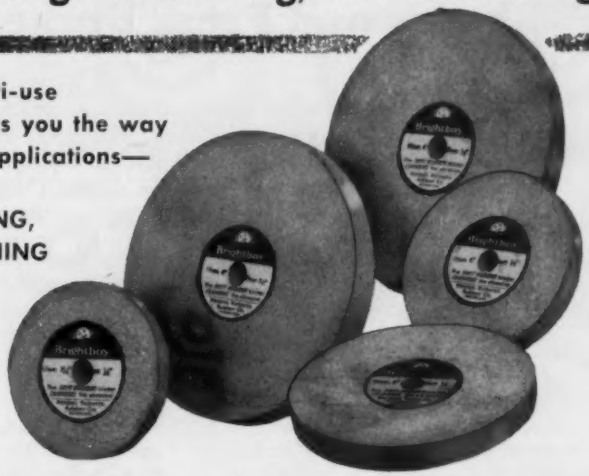
It's what's IN these wheels That brings OUT big, new time-savings

Each of these multi-use "Brightboys" shows you the way to new abrasive applications—
ONE-STEP
BURRING, FINISHING, CLEANING, POLISHING



BE PREPARED FOR A REVELATION IN FINISHING! Disregard your previous concepts of abrasives uses. Try Brightboy and witness its working action—the unique combination of rubber and abrasive that's definitely "different". You will discover applications never before associated with abrasives; so wide, so varied. A Brightboy finish frequently serves as the final polish.

You can use readily-available Brightboy stock numbers, JOB-MATCHED to your needs, not only for usual finishing but also in place of many "special" compounds that may take longer for delivery. Wide selection in Silicon Carbide and Aluminum Oxide grains. Each in grades from extra fine to extra coarse, in soft, firm and tough rubber binders.

Ask your dealer to recommend the Brightboy numbers specifically suited to your needs. Ask him for the Brightboy Catalog listing grains and textures, applications, machine speeds. Write us if he cannot supply you or on any problem in which finishing is involved.

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RUBBER CUSHIONED ABRASIVES

BRIGHTBOY INDUSTRIAL DIVISION
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America's Pioneer Manufacturer of Rubber-Bonded Abrasives

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For more data circle 345 on Reader Service Card

DETREX CHEMICAL INDUSTRIES *say:*

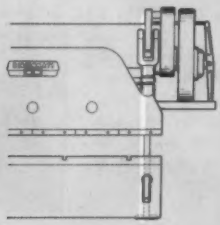
"Our sheet metal department is built around Cincinnati Shears and Press Brakes."

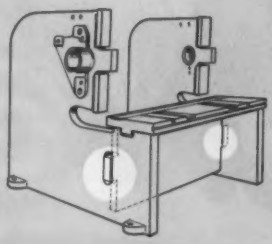
Three Cincinnati Shears and two Cincinnati Press Brakes are operating profitably in this finely equipped shop. All of the sheet steel parts needed to fabricate an entire line of drycleaning equipment are produced on these versatile machines. The materials range in thickness from No. 16 gauge to ⅜".

An interesting feature of this application is the adjustable handling "table" made by inserting ball-transfers into prepared holes in the plant floor. Plugs cover the holes when they are not being used. This system solves the problem of getting a variety of pieces from the Shears to the Press Brakes.

Centerline Loading is a standard feature of all Cincinnati Press Brakes. Since working forces are contained directly in the housings, weaving of the frame and cramping of the ram slides, guides and shaft bearings are eliminated. Centerline loading makes it possible to concentrate most of the weight of a Cincinnati Press Brake in the four main members, which provides maximum strength per pound of machine. Write Department G for Catalog B-4R, which gives full details.

All-Steel, Interlocked Construction is a standard feature of Cincinnati Shears. All the main members are of rolled steel plate, yet no welds are used as load supports. In addition to eliminating strains which affect accuracy, Cincinnati interlocked construction also reduces freight, foundation and installation costs. Write Department G for Catalog S-7R, which gives full details.

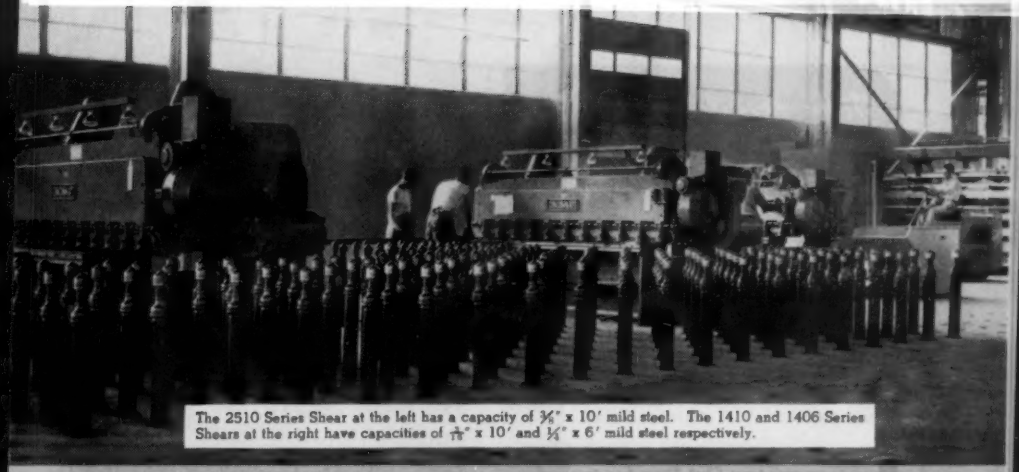




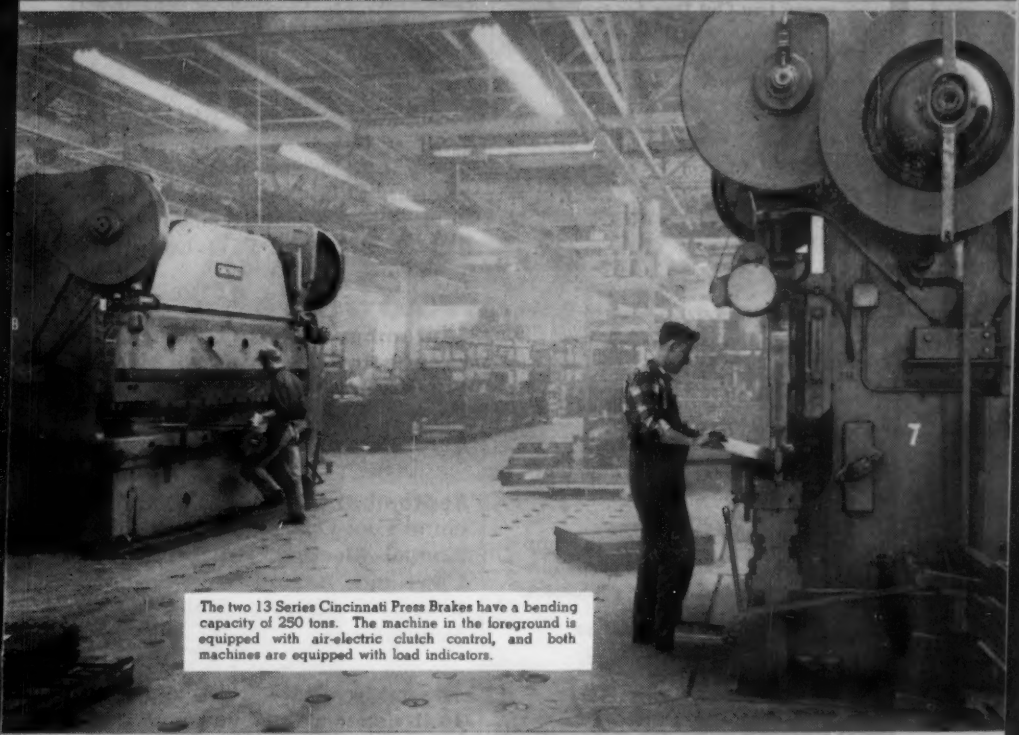
CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES

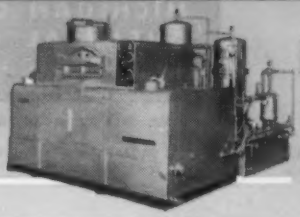


The 2510 Series Shear at the left has a capacity of 3/8" x 10' mild steel. The 1410 and 1406 Series Shears at the right have capacities of 7/16" x 10' and 1/4" x 6' mild steel respectively.



The two 13 Series Cincinnati Press Brakes have a bending capacity of 250 tons. The machine in the foreground is equipped with air-electric clutch control, and both machines are equipped with load indicators.

Photographs courtesy Detrex Chemical Industries, Inc., Bowling Green, Kentucky.



This two-bath Ambassador Model 600S drycleaning machine is typical of the Detrex line of quality equipment produced with the aid of Cincinnati Shaper Company machines.

Now Available...
FOR YOUR CONVENIENCE

Miccro *Supreme Spray*

LAY-OUT DYE
(Purple)

A new, easy-to-use, dependable, spray Lay-Out Dye for tool, die, pattern, or template layout on metal. Dries instantly—shows up in sharp relief.

Also Still Available...

Miccro *Supreme*

LAY-OUT AND IDENTIFICATION DYE (7 Colors)

For layout on metal and quick identification of bar stock, sheets, strips, or parts. Also dries instantly and shows up in sharp relief. Available in brush-in-cap cans and larger containers.

Write for circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
8615 Grinnell Ave. • Detroit 13, Mich.

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Meetings

Important Meeting Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

July 24-27 • National Tool and Die Manufacturers Association, Summer Meeting, Grove Park Inn, Asheville, N. C. Association headquarters: 907 Public Square Bldg., Cleveland 13, Ohio.

September 9-13 • Instrument Society of America, Annual Instrument-Automation Conference and Exhibit, Public Auditorium, Cleveland, Ohio. Society headquarters: 313 Sixth Ave., Pittsburgh 22, Pennsylvania.

September 17-20 • American Die Casting Institute, Annual Meeting, Edgewater Beach Hotel, Chicago. Institute headquarters: 366 Madison Ave., New York 17, New York.

September 22-24 • American Machine Tool Distributors Association, Annual Meeting, Hotel Cleveland, Cleveland. Association headquarters: 1900 Arch St., Philadelphia 3, Pennsylvania.

September 23-26 • Association of Iron and Steel Engineers, Annual Convention, Penn-Sheraton Hotel, Pittsburgh. Association headquarters: 1010 Empire Bldg., Pittsburgh 22, Pennsylvania.

PROOF THAT LUSOL LOWERS COSTS IMPROVES PRODUCTION

THE WORK: Tapping and threading 1" x 14" bolts.

MATERIAL: 1018-1020 Steel, Alloy Steel, and some Stainless Steel.

COST PER GALLON IN MACHINE: Lusol, approx. 27¢; former coolant (cutting oil), approx. 50¢.

TOOL LIFE: Approx. 2-1 over previous coolant.

While running with oil, entire dept. was filled with smoke, and pieces were so hot they had to be removed with tongs. Lusol eliminated smoke entirely and pieces can be removed by hand.

Improved *Lusol* STEPS UP PRODUCTION

Oil-free, transparent, water-soluble Lusol has the highest heat removing capacity of all coolants, regardless of type. It keeps tools cooler so cutting edges last longer, keeps work pieces cooler so closer tolerances can be maintained. No smoke, no odors, no oily floors, no dermatitis—it adds up to better production every time.

THE *Lusol*.. LINE

BETTER PRODUCTS FOR BETTER METALWORKING

F. E. ANDERSON OIL COMPANY INC.

BOX 216, PORTLAND, CONNECTICUT

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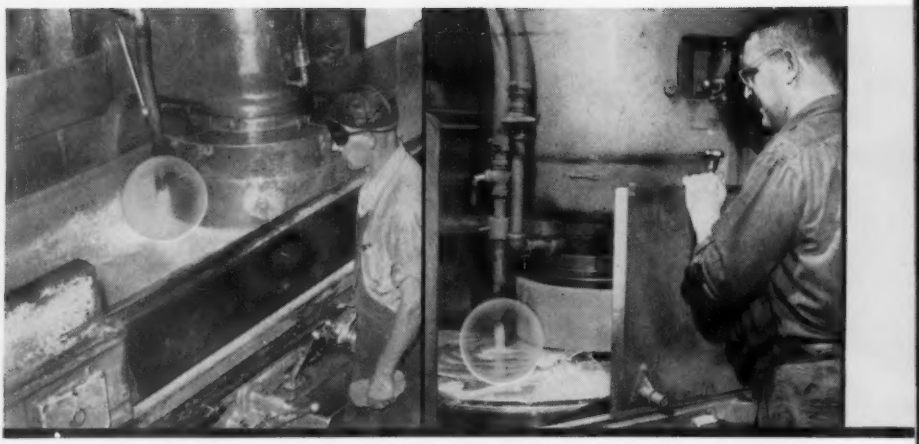

When you surface grind with segments

Take advantage of this COMPLETE Line

. . . and add the profit-boosting "Touch of Gold" to any surface grinder

You can be sure that switching from grinding wheels to Norton abrasive segments brings powerful, profit-building "Touch of Gold" benefits to very many jobs.

Because —

Norton makes segments in every required shape and size and in exactly the right abrasive and bond for best results in the widest variety of surface grinding — on ferrous and non-ferrous metals and on work pieces ranging from boiler plate to the hardest die steels, die sets or blocks.

Norton segments are made in many ALUNDUM* abrasives. Of these, 32 ALUNDUM abrasive is particularly suited for fast stock removal and heavy feeds. 37C CRYSTOLON* abrasive, unequalled on hard cast iron and soft non-ferrous

metals, is also available. And diamond segments are also furnished, if desired, for ceramics, quartz and glass.

Bonds include the G and BE — both vitrified — as well as resinoid bonds. Structure can be either regular or the open (induced pore) which is especially advantageous for many jobs. In the field of surface grinding, users have reported that the G Bond — most efficient vitrified bond ever developed — results in new speed and economy.

With this broad range of abrasives and bonds to choose from you can count on much faster production rate at considerably lower costs. And when you mount these cost-cutting segments in Norton chucks — designed to fit several machines — you safeguard performance and profits.

Ask Your Norton Distributor for the booklet, "The A.B.C. of Surface Grinding." Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

W-1803

NORTON

ABRASIVES

Making better products...
to make your products better

NORTON PRODUCTS

Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING DIVISION

Coated Abrasives • Sharpening Stones
Behr-cat Tapes

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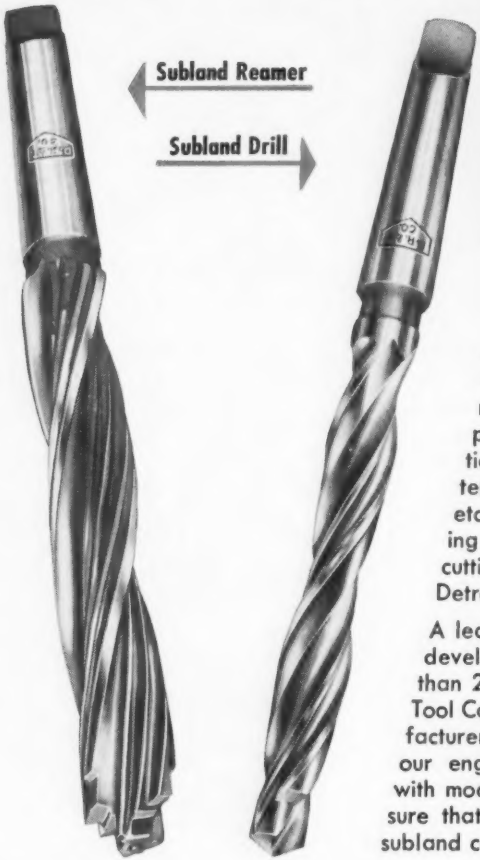
SUBLAND TOOLS—

(Standard and Special)



Reduce SET-UP TIME, Cut PRODUCTION COSTS

To produce more work in less time and at reduced costs, modern production methods often require multi-diameter tools that perform a combination of operations with each pass—drill-counterbore, drill-ream, drill-chamfer, etc. Your best bet for accomplishing these objectives are subland cutting tools, precision produced by Detroit Reamer & Tool Company.

A leading participant in the original development of subland tools more than 25 years ago, Detroit Reamer & Tool Company has been a major manufacturer of such tools ever since. Thus, our engineering experience combined with modern manufacturing facilities assure that you receive the finest quality subland cutting tools.

D R & T COMPANY

DETROIT REAMER & TOOL COMPANY

780 W. MAPLE RD. • P.O. BOX 174 • BIRMINGHAM, MICH.

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modern machine shop

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Granville M. Fillmore, *Vice President,* 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

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BETTER

Because They're

BALANCED

du Mont Tool Bits hold a keener cutting edge longer, give you more cuts per bit, more cuts per dollar. That's because *toughness, red hardness* and *wear resistance* are in precise *balance.*

High Speed Ground Square and Rectangular

du MONT TOOL BITS

The du MONT CORPORATION, Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST S

Name.....

Company.....

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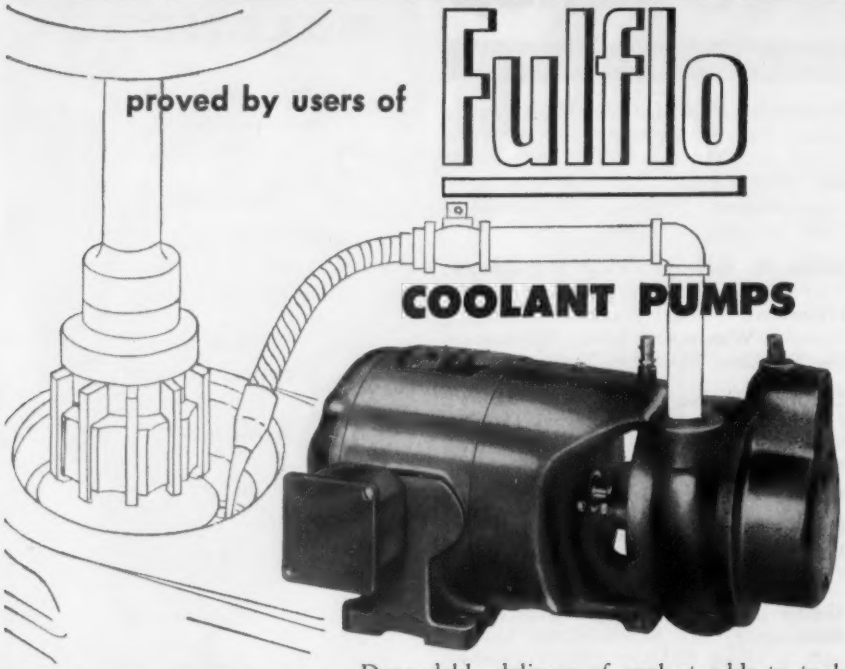
Cool Tool Long Life

proved by users of **Fulflo**

COOLANT PUMPS



Dependable delivery of coolant adds to tool life. FULFLO Coolant Pumps are built to machine tool standards, provided with heavy duty bearings, for long, reliable service. The FULFLO pump line is comprehensive, practical, economical and efficient: Belt, direct and motor-driven models, right and left rotation, horizontal and vertical tyeps with choice of bearings.

For trouble-free hydraulic PRESSURE CONTROL, install **FULFLO Oil-Relief Valves**

Pipe sizes to 2½" Pressures to 500#

WRITE for "Fulflo Mechanical Data Book," handy reference to valves or pumps

THE FULFLO SPECIALTIES CO., INC.
416 Fancy Ave. • Blanchester, Ohio

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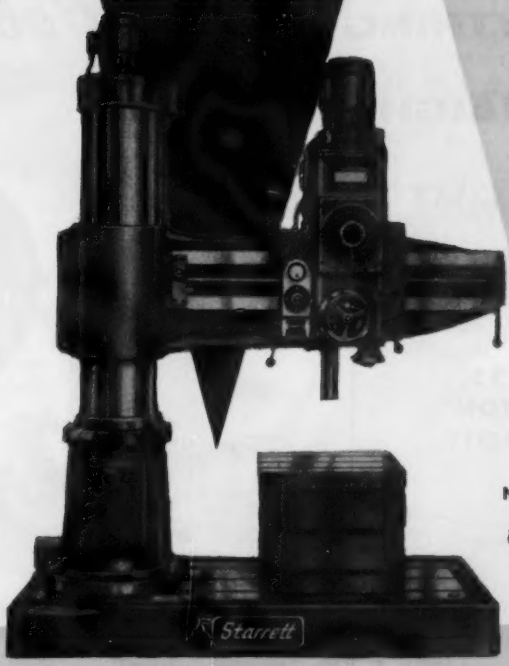
STARRETT RADIAL DRILLS

WORLD'S BEST VALUES

For . . . MAXIMUM EFFICIENCY LONGER LIFE



SIZES:
2½' to 6' with 10", 12½" & 14½" columns. Ground nickle-chrome steel gears. Safety feed. Preselector depth control. Automatic lubrication.
from $1995. to $6985.

No. 5 Morse Taper with centralized electro-mechanical clamping device

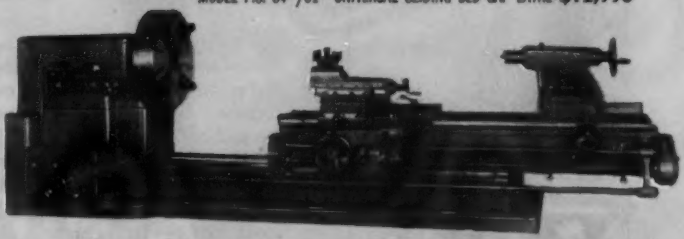
IMPERIAL LATHES

FLAME HARDENED, GROUND BED WAYS. HEAT-TREATED, HARDENED GEARS THROUGHOUT. SUPER PRECISION, ROLLER SPINDLE BEARINGS. EXTREMELY HEAVY CARRIAGE. AUTOMATIC LUBRICATION.

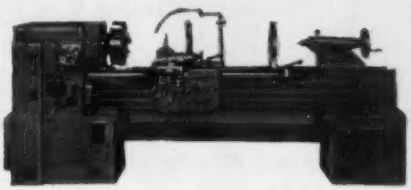
Available sizes from 12" to 67" swing, priced from $1,298 for 12" to $19,490 for 67".

Slightly higher on west coast.

MODEL P.S. 34"/61" UNIVERSAL SLIDING BED GAP LATHE **$12,990**



MODEL M.P. 24"/35" swing **$7,985**



instantaneous "preselector" for speed control

AARON

MACHINERY CO., INC.

"DEPT. M"
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NEW YORK 12, NEW YORK
WAlker 5-8200

Branches at: Buffalo, N. Y., Mineola, N. Y., Los Angeles, Cal.

RENTAL PLANS, LIBERAL TERMS

See page 67

ANYTHING WE CAN *HELP YOU* STRAIGHTEN OUT?

ANDERSON HYDRAULIC STRAIGHTENING PRESS

10, 25, 50 TON CAPACITY

Manufacturers with straightening, checking, and truing operations that require speed and accuracy find Anderson Power Presses to be the answer to their problems. Available with either traveling or stationary ram. Capacities up to 10, 25, and 50 tons. (Press illustrated is of 50 ton capacity.) So accurate a shaft can be straightened to within .001". Flexible, sensitive control valve operated by hand lever. Let us show you how you can profit from low-cost, high-production, precision straightening. Write for Bulletin 7-22.

Anderson

Write for Bulletin 7-22

ANDERSON BROS. MFG. CO.
ROCKFORD, ILLINOIS

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See page 67

BOSTON Gear READY TO INSTALL

BORED-TO-SIZE SPROCKETS

Complete with keyway and set screw

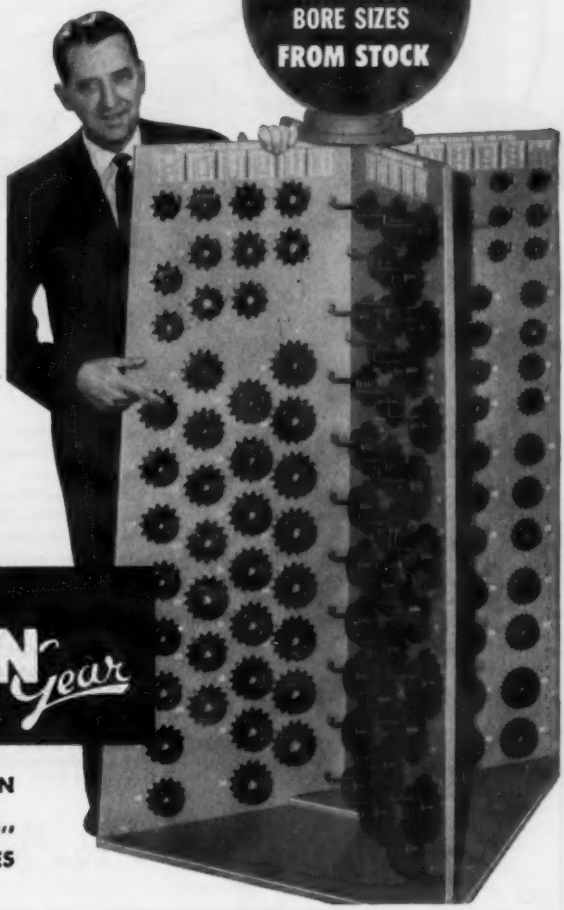
76 PINION SIZES WITH 321 BORE SIZES FROM STOCK

SAVE YOU 50% or more by eliminating all machining costs . . . no reboring, no keyway cutting, no drilling and tapping.

Your Boston Gear Distributor can deliver promptly any size and bore you need from his Bored-to-Size Sprocket stock rack of 321 different pinions.

Why do-it-yourself? Why not be cost-wise . . . buy BORED-TO-SIZE.

See Catalog No. 56 for complete listings. Boston Gear Works, 68 Hayward St., Quincy 71, Mass.



CALL YOUR BOSTON Gear DISTRIBUTOR

7124 TRANSMISSION PRODUCTS "OFF-THE-SHELF" AT FACTORY PRICES

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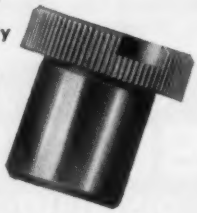
WHAT...
NO ***UNIVERSAL***
DRILL
BUSHINGS?

You'll get fast delivery—often within 24 hours—on all standard sizes and lengths of drill bushings when you order from Universal's big stocks in any of three warehouses located at Frankenmuth, Michigan; Kenosha, Wisconsin; and Newark, New Jersey. Even those orders for specially-made, non-standard sizes are filled quickly, thanks to Universal's large-volume production facilities. Machined from highest quality steel, Universal bushings have super-finished bores which lengthen tool life and reduce bushing wear. Wherever there are holes to drill using jigs or fixtures, you'll find that it pays to specify precision-made Universal drill bushings.



FREE UNIVERSAL SELECTOR. Gives all engineering data for selection of all types and sizes of drill bushings up to 1¾" drill size. Send request on your company letterhead to receive one of these helpful Universal Selectors.

UNIVERSAL ENGINEERING CO., FRANKENMUTH 9, MICHIGAN

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Factory Mutual Laboratories, Norwood, Mass.

Factory Mutual Laboratories test

SHELL IRUS FLUID 902

the low-cost, fire-resistant hydraulic fluid

Factory Mutual Laboratories, the well-known industrial testing authority, recently evaluated Shell Irus* Fluid 902.

The tests performed included:

1. **Flash Point**
2. **Autoignition**
3. **Flame Propagation**

The Shell Industrial Engineer can give you more information about these tests.

*Trademark

In plant after plant, users find that Shell Irus Fluid 902 is comparable in fire resistance to much higher priced hydraulic fluids.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

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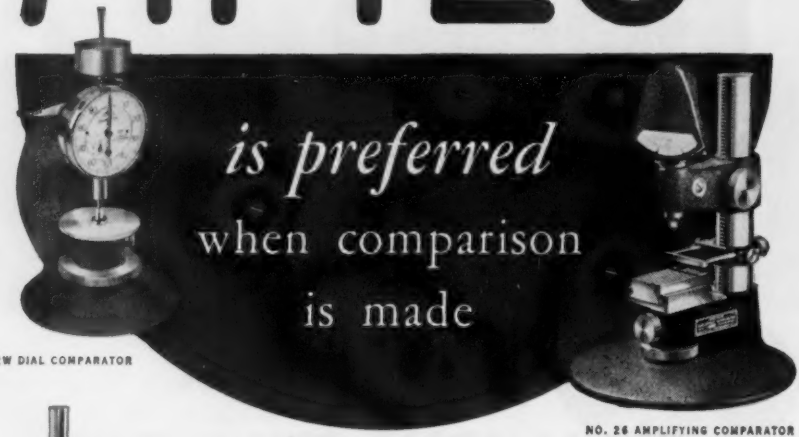
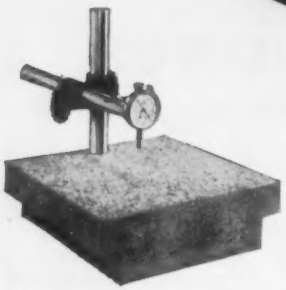


is preferred
when comparison
is made

NO. 2W DIAL COMPARATOR

NO. 26 AMPLIFYING COMPARATOR



MODEL 130 GP.

For fast, accurate measurements, Ames Dial Comparators are the choice of quality control men everywhere. You get definite, impersonal readings directly from the dial. There's no guesswork or figuring.

Special comparators are available for measuring resilient materials such as rubber, paper, etc., and for measuring non-yielding materials such as sheet metal, glass and plastic. Write for complete details.

Representatives in principal cities

B.C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

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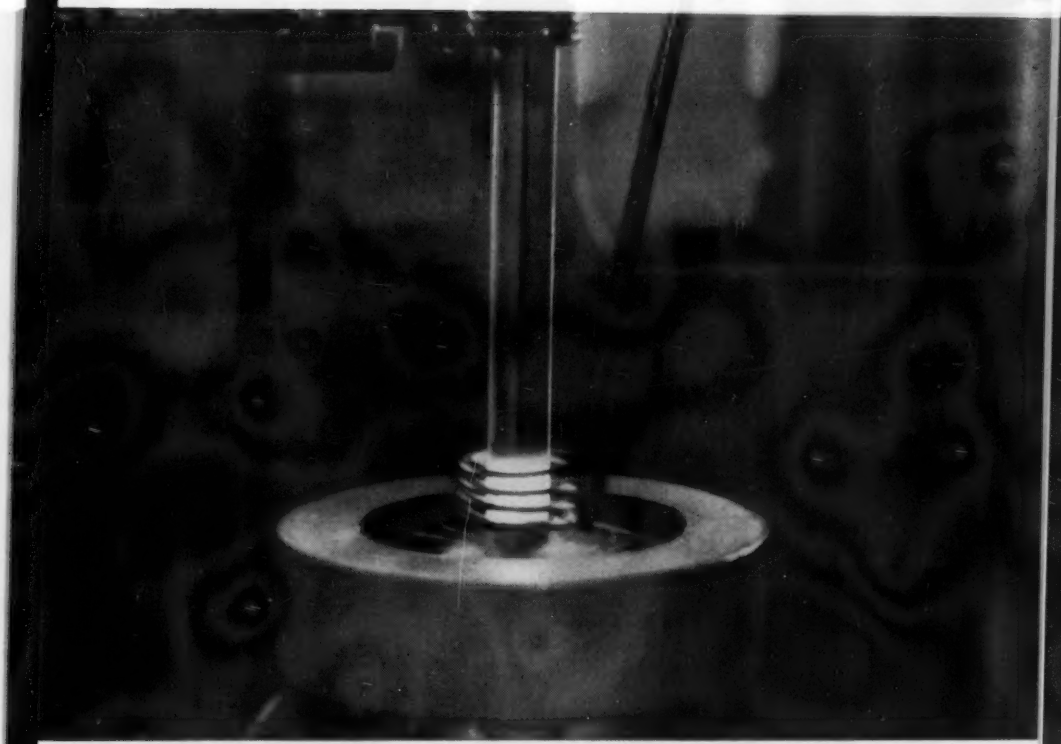


Ketos shaft being induction hardened to Rockwell 55-56, while ends remain soft for final machining. Photographed at Control Instrument Co., Inc., Brooklyn, N. Y.

KETOS has wide hardening range with minimum volume change...

Ketos is a low priced alloy tool steel that can be hardened from low temperatures with practically no volume change. It has deep hardening qualities, and a fine grained structure, that make it desirable for many production parts.

That's why nondeforming Ketos is well suited not only for most tool steel applications such as gauges, dies, and taps but also for close-tolerance, wear-resistant parts like the actuator bar shown in the induction heating unit above. The thin contact edges of this particular part withstood a "life test" of over 4-million high speed blows. No other steel tested lasted more than 1-million cycles before it chipped and failed.

If Ketos sounds like the steel you should be using, call your nearby Crucible warehouse. Stocks of Ketos and dozens of other special tool steels are large, delivery fast. *Crucible Steel Company of America, Chamber of Commerce Bldg., 7th Ave. and Smithfield St., Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

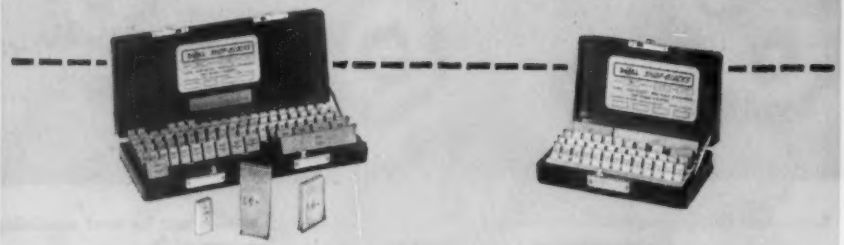
Canadian Distributor — Railway & Power Engineering Corp., Ltd.

For more data circle 362 on Reader Service Card

New "A" Grade Gage Blocks
Priced for Use in the Shop

DoALL SHOP-BLOCKS
Guaranteed

"A" Grade Accuracy: + .000006"
− .000002"
"A" Grade Flatness: .000004"
"A" Grade Parallelism: .000004"
"A" Grade Surface Finish: 0.8 AA
"A" Grade Hardness: 65 Rc



SET NO. 860
84 pieces*
Only $265

.0001" Series—9 Blocks .1001" thru .1009"
.001" Series—49 Blocks .101" thru .149"
.050" Series—19 Blocks .050" thru .950"
1.000" Series—4 Blocks 1.000" thru 4.000"
Quarter tenth Series—3 Blocks .100025" .100050", .100075"

SET NO. 380
36 pieces*
Only $130

.0001" Series—9 Blocks .1001" thru .1009"
.001" Series—9 Blocks .101" thru .109"
.010" Series—9 Blocks .110" thru .190"
.100" Series—5 Blocks .100" thru .500"
1.000" Series—3 Blocks 1.000", 2.000", 4.000"
Half tenth Series—1 Block .10005"

Now you can bring totally new accuracies to shop measurements with DoALL SHOP-BLOCKS . . . *guaranteed* "A" grade, yet available at "B" grade "working" block prices.

These blocks are available from stock today. Call your local DoALL Store, or write.

**.050" or .100" steel or carbide wear blocks available at slight extra cost.*

THE DoALL COMPANY • Des Plaines, Illinois

DoALL

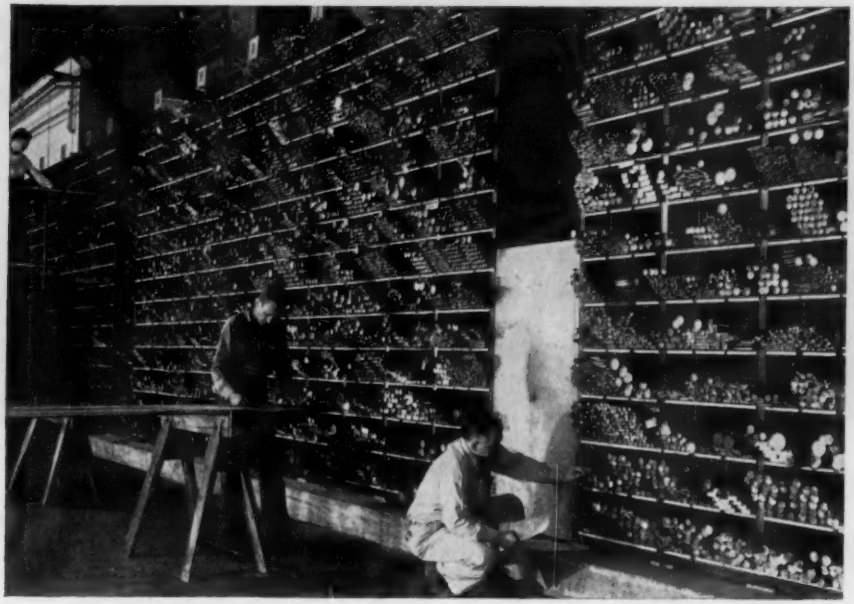
Catalog free on request—send for your copy today.

GB-245

For more data circle **363** on Reader Service Card

Canadian Distributor — Railway & Power Engineering Corp., Ltd.
For more data circle **362** on Reader Service Card

Here's "One-Stop" Shopping for Armco Stainless Bar and Wire



Armco produces 58 standard and special grades of stainless steel bar and wire, including seven free-machining grades. All are available through your nearby Distributor of Armco Stainless Steels. Many grades are kept in stock for immediate delivery.

Armco Distributors are also prepared to supply complete information about physical, chemical and typical mechanical properties, as well as machining characteristics of Armco Stainless Steels.

For easy "one-stop" shopping for stainless steel bar and wire, it will pay you to become acquainted with your nearest Armco distributor. If you don't know his name, write us at the address below. We'll put you in touch with him.

ARMCO STEEL CORPORATION

1207 Curtis Street, Middletown, Ohio • Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation

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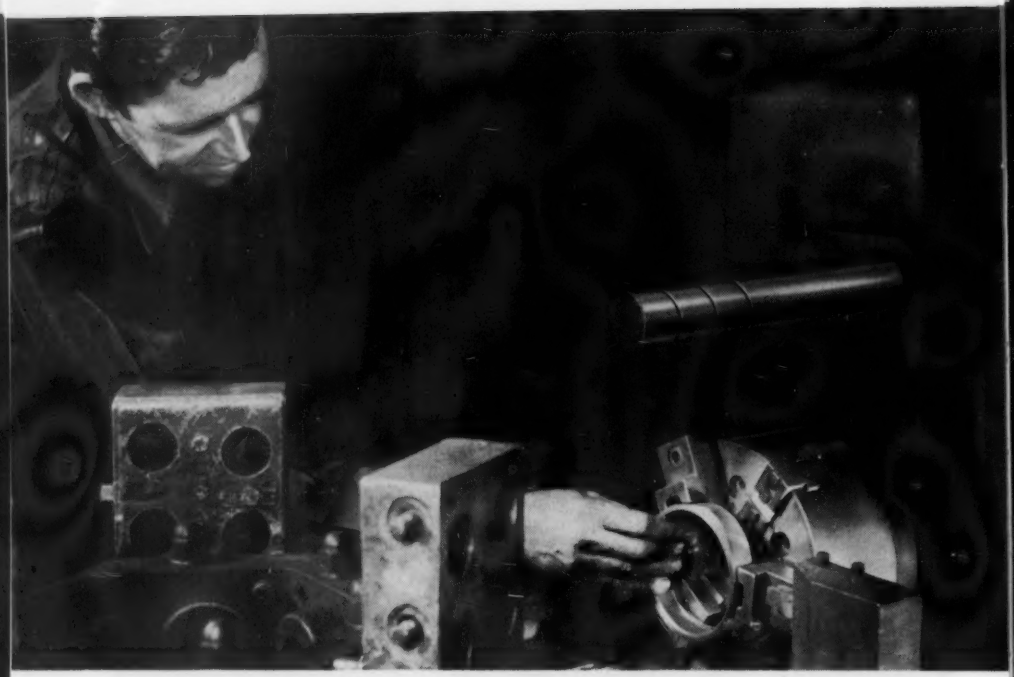


Skinner Power Chucks will chalk up immediate savings on your production machines!

Skinner Power Chucks grip and release instantly because compressed air does all the hard work. Time-wasting hand wrenching is eliminated. Work goes much faster, is far less fatiguing. You save valuable time and money on every piece.

You'll put your plant in a much better profit position when you equip your production machines with Skinner Power Chucks. They'll greatly reduce your most important cost factor: over-all machining time.

Send for full details about converting your present lathes into high-production machines with Skinner Power Chucks. Write Dept. 177 for Catalog 68P with specifications, applications and installation instructions.

Skinner Power Chucks are available through leading Industrial Distributors everywhere.

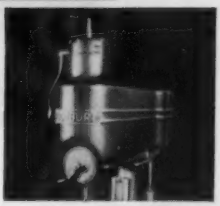
SKINNER CHUCKS

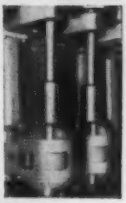
THE SKINNER CHUCK COMPANY

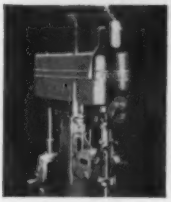
ESTABLISHED 1887

FOOTBURT

No. 2 Machine with Back Gear • 12" Overhang • 5/8" Drilling Capacity in Steel • Optional Speed Ranges • 185 to 2300 RPM • 280 to 3450 RPM • Vertical Motor Drive with Standard Single Speed Motor • Power Feed Assembly • Tapping Attachment • Coolant Outfit.







Sensitive drilling machines

A FULL RANGE DRILLING MACHINE ENGINEERED FOR PRODUCTION

Built carefully to provide the required accuracy for fine tool room work, Footburt Sensitives are designed with the weight and stability to maintain close tolerances on day after day production work. The correct speed for a wide range of drilling, reaming, and counter-boring operations is instantly available. Write for full information on this great line of Sensitive Drilling Machines. Built in 1,2,3,4,6 Spindle Models.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

Detroit Office: 24632 Northwestern Highway, Detroit 35, Mich.

ENGINEERED FOR PRODUCTION • *Write for Circular #508A.*

FOOTBURT

MACHINE TOOLS

For more data circle **366** on Reader Service Card

EXTRAORDINARY PRECISION & QUALITY

THE SKINNER CHUCK COMPANY
ESTABLISHED 1887

81-Block
REFERENCE SET

VK "Quality in Millionths"

VAN KEUREN
RECTANGULAR GAGE BLOCKS

Thirty-eight years of experience in manufacturing gage blocks plus the finest in modern measuring instrumentation produce the *"Quality in Millionths"* evident in VK rectangular gage blocks.

These gages are the end product of many skills developed over a long period of time. Final accuracy is controlled by absolute measurement of our master standards on the latest design Zeiss Interferometer, and by comparison with masters calibrated by Interferometry at the National Bureau of Standards, Washington, D.C. VK gage block measurements are made in a modern Gage Room in which temperature is held to 68° ± .1°F. Surface finish is inspected by a Zeiss Interference Microscope.

Van Keuren rectangular gage blocks are offered in Class A (± .000004") and Class B (± .000008") accuracy. They are guaranteed for length, flatness, parallelism, surface finish, hardness and stability. A certificate showing the exact size of each block is furnished with all Class A sets.

VK MICROGAGES

Set M35L Price $120.00

For "working" gage blocks we recommend VK ⅞" diameter microgages in the new Class "A" (+ .000008" — .000000") accuracy. These gages are available in 16 sets, including the 35 block set shown above, and the valuable set M81 at $250.00.

The tolerance on VK microgages has again been halved, and all microgages are now furnished to + .000008" — .000000", at no increase in price. Tolerance is all plus to provide necessary wear allowance on working blocks.

VK
38th YEAR

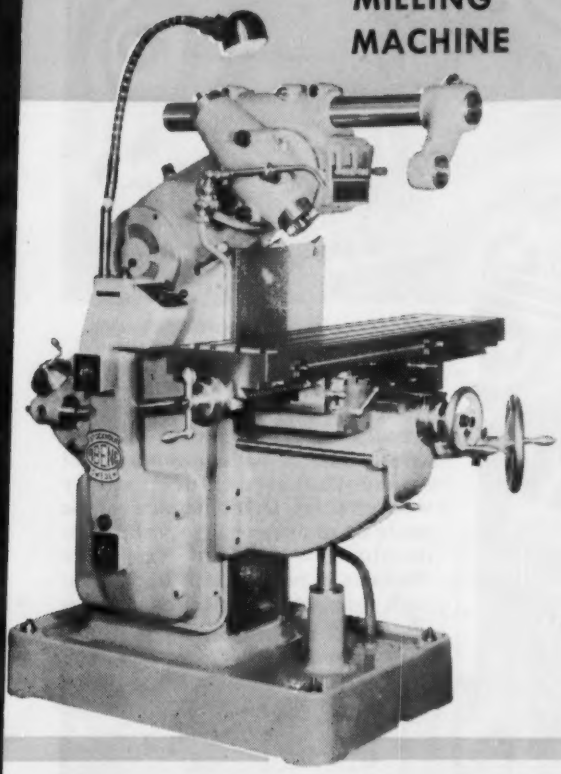
THE Van Keuren CO.,
175 WALTHAM STREET, WATERTOWN, MASS.

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . . Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master Setting Disks . . . Thread Measuring Wires . . . Gear Measuring Wires . . . Carbide Plug Gages . . . Carbide Pivots . . . Precision Lapping Service.

For more data circle **367** on Reader Service Card

EXTRAORDINARY PRECISION & QUALITY
at amazing low cost!

ABENE COMBINED VERTICAL HORIZONTAL MILLING MACHINE



Combines full scope of vertical and horizontal millers. Features: Fully adjustable spindle with 12 speeds from 50-1300 rpm, 12 longitudinal feeds per min., 40 x 10½ table. Stable in all positions. Full safety. Rapid changing from horizontal to vertical, 0° to 45° from plane.

$3,990.

AARON
MACHINERY CO., INC.
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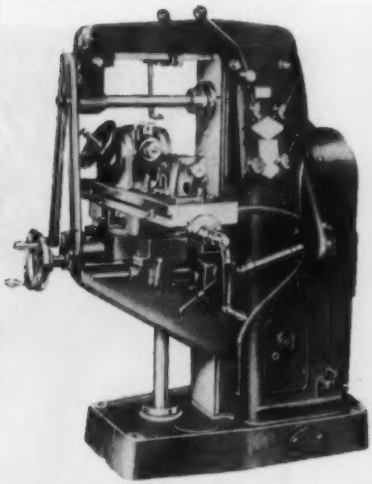
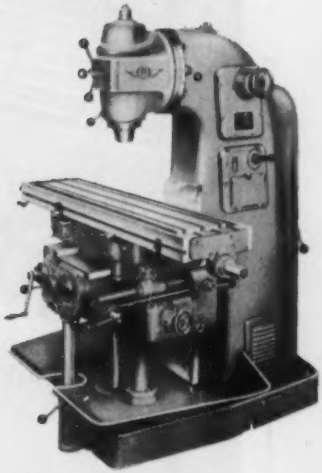
WAlker 5-8300
Branches at:
Buffalo, N. Y.
Mineola, N. Y.
Los Angeles, Calif.
San Francisco, Calif.



VPU-0 $2,695.



VPV-2 $6,890.

PEDERSEN UNIVERSAL TOOL & CUTTER GRINDER, MODEL U.S.L.
36½" x 5½" table working surface.
$2,595

See page 55 LIBERAL TERMS • RENTALS • IMMEDIATE DELIVERY

IN STOCK! AVAILABLE NOW!

54 *Different* SETS OF

BOKUM BORING TOOLS

You'll find it convenient to have Bokum Boring Tools in sets — containing just the sizes you most frequently use. There are 54 different assortments of tools in stock at all times—packaged in neat, sturdy wooden cases. Combinations can be made up to answer any specific production requirement. Tools are available in both carbide-tipped and high speed steel. Write for catalogs illustrating this extra convenience.

TRADE MARK REG. U. S. PAT. OFF.

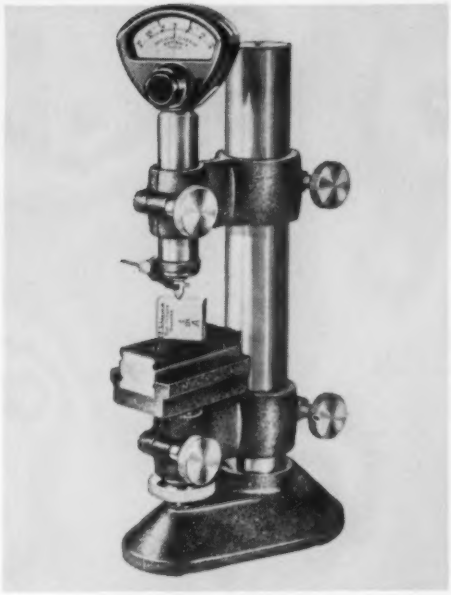
BOKUM TOOL CO. INC. 14775 Wildemere Ave. Detroit 38, Mich.

See page 55 LIBERAL TERMS • RENTALS • IMMEDIATE DELIVERY

PEDERSEN UNIVERSAL TOOL & CUTTER GRINDER, MODEL U.S.L.
36½" x 5½" table working surface.
$2,595

JOHANSSON GAGING EQUIPMENT

Assures You Precision to the Finest Degree to Meet Your Requirements —Backed by the Name Supreme in the World of Measurement



GAGE BLOCKS

(JOHANSSON) and accessories. Short deliveries. Inspection and reconditioning service available at our plant.

INTERNAL INDICATORS

(for inside measurements .155 to 24 inches). Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

MIKROKATOR

(Amplifier—for outside measurements) Graduations .0001 to .000001 or .01M to .0002M.

OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.

MIKROKATORS
(AMPLIFIERS)
FOR MEASUREMENT IN INCHES

Catalog Number	Scale Range Inches	Graduations Inches
510-E2	0".006	0".0001
510-E4	0".0024	0".00005
510-E5	0".0014	0".00002
510-E6	0".0008	0".00001
510-E7	0".0004	0".000005
510-E8	0".0002	0".000002
510-E9	0".00004	0".000001

Write for Literature

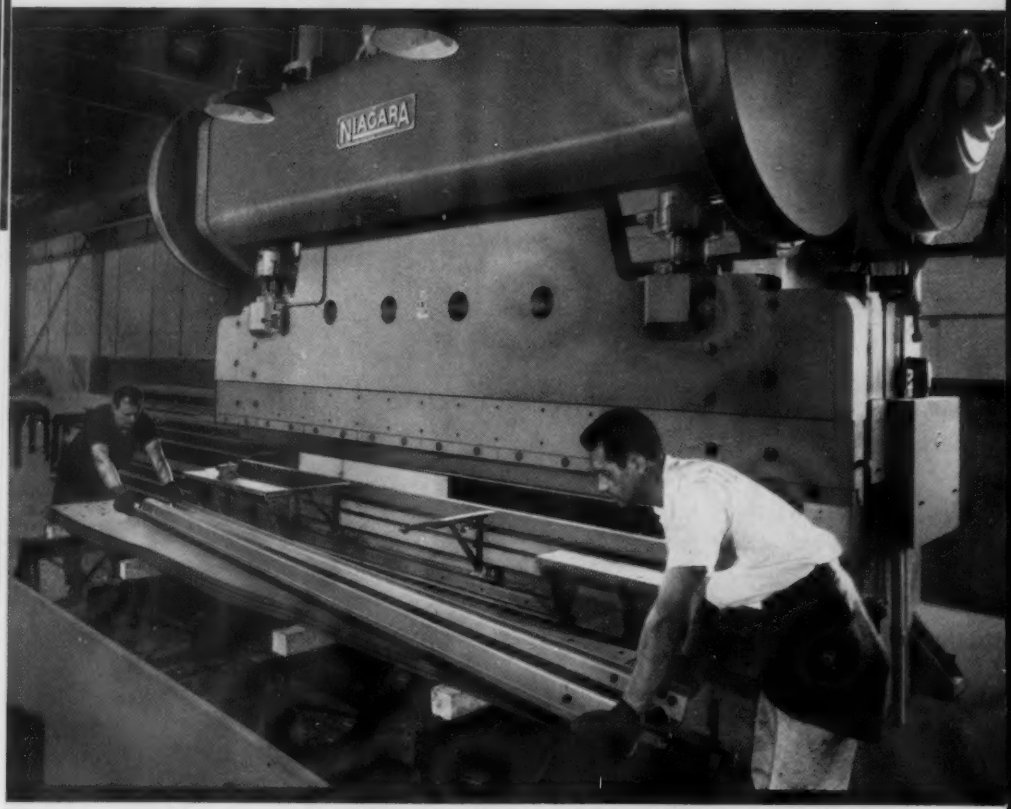
C. E. JOHANSSON GAGE CO.

A DIVISION OF SWEDISH GAGE CO.

10641 HAGGERTY AVE. • BOX 4086 NORTHEASTERN STATION • DEARBORN 1, MICH.

For more data circle **370** on Reader Service Card

"we go back to



(Above) Forming highway guard rails from 12 gage steel on Niagara 520 Ton Press Brake.

(Right) Piercing rails with same machine.

(Far Right) Forming chair seat frames for office furniture from 20 gage steel on Niagara 150 Ton Press Brake

Niagara for Press Brakes"

"The personnel of our organization has been acquainted with Niagara equipment for years. Niagara will stand behind *any* equipment furnished. Many millions of operations in the past 5 years on their presses and press brakes . . . equipment satisfactory from both the operational and safety standpoint. Our intention is to use the Niagara line entirely."

There in the words of one customer (a large Ohio metal fabricator whose press brake operations are illustrated), you have the sentiments of hundreds. Once experienced with *any* of the other metalworking machines which Niagara makes . . presses, shears, bending rolls and dozens more . . . one just naturally thinks first of Niagara whenever the subject of press brakes comes up.

REASONS ARE MANIFOLD: (1) Extreme helpfulness of Niagara's engineers in selecting the machine and accessories that will do the job best (no other manufacturer can offer so complete and large a line of sheet and plate metalworking equipment). (2) Unrivaled reputation and experience in the field, dating back 77 years, that assure unquestioned reliability. (3) World-wide recognition for design leadership, combining rock-bottom operating economy and top-notch performance in *every* product it makes (take a moment to run down this partial list of imposing press brake features).

- ***Double end twin drive with double reduction gearing for smooth, uniform application of power at both ends of ram.***
- ***Rugged, all-steel frames with box type crowns of unequaled strength and rigidity.***
- ***Extra heavy, rigid bed and ram for maximum support of dies.***
- ***Gearing totally enclosed in sealed oil baths for thorough, clean lubrication.***
- ***Longer lasting, laminated, nonmetallic ways.***
- ***Powerful, smooth-acting, multiple disc clutch and brake.***
- ***Gibs maintain accurate, endwise alignment of ram.***

Standardized in a complete line, ranging from 50 through 775-ton capacities, Niagara Press Brakes are built to produce a tremendous variety of work uniformly and accurately. Post yourself now on all the details by requesting Bulletin 89 D and, as soon as you can, avail yourself of some really worthwhile suggestions from a Niagara representative. Write.

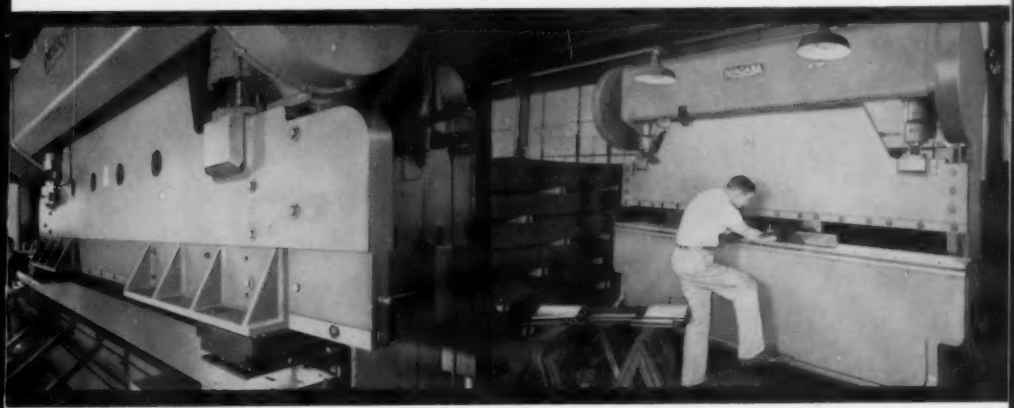
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U.S. cities and major foreign countries

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work



NIAGARA PRESS BRAKES

(Far Right) Forming chair seat frames for office furniture from 20 gage steel on Niagara 150 Ton Press Brake

Form or Dress Your Tool Wheels

=in=a=jiffy=

Clean up a wheel face

Form a radius or groove

Touch up a cup or saucer

with a NORBIDE Dressing Stick*

A NORBIDE Stick of boron carbide — the hardest material made by man — will outlast hundreds of ordinary abrasive sticks. You'll find it will greatly reduce dressing dust nuisance also. Order a supply of these cost-cutting sticks from your local Norton distributor or write for Form 1567 giving more details.

*Actual size (3/16" x 1/2" x 3")

NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.

NORTON BORON CARBIDE — *Making better products... to make your products better*

For more data circle **373** on Reader Service Card

extra!

ALL ABOUT THE LATEST BENDING METHODS

Let Pedrick show you how the latest methods of bending pipe, tube and structural metal—on a job or production basis—can save you money.

For full information on Pedrick Production Benders, write PEDRICK TOOL AND MACHINE CO., 3640 N. Lawrence St., Phila. 40, Pa. Dept. 5.

FREE "PEDRICK LINE" BULLETIN.
WRITE TODAY.

PEDRICK production benders

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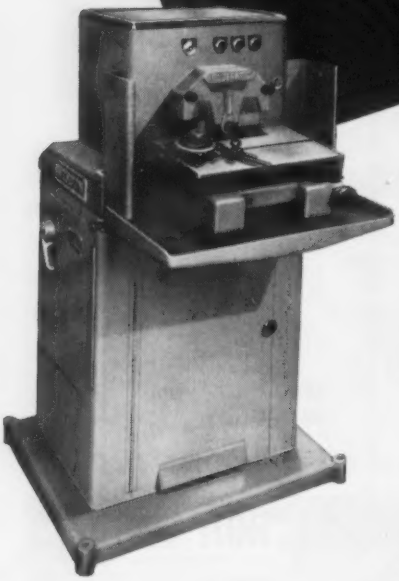
WESSON'S Tru-Arc Grinding Principle takes the skill and high cost out of precision tool grinding.

Ask for this
WESSON BULLETIN...



.... and learn how to get

(a) far lower diamond wheel cost
(b) faster, effortless carbide grinding
(c) hone-like finishes

AUTOMATICALLY without need for skilled operators.

Ask for Bulletin PG157.

tools Wesson carbide Wessonmetal

WESSON COMPANY DEPT. AD
1220 Woodward Heights Blvd., Detroit 20, Mich.
IN CANADA:
WESSON CUTTING TOOLS, LTD.
93 JUDGE ROAD, TORONTO 18, ONTARIO

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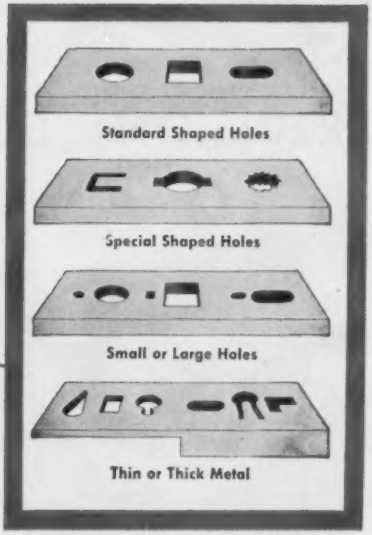
WHEN R-B Punches Are Used



What are your piercing or forming requirements—standard or unusual shapes—small or large holes—steel or special alloys—thin or thick metals? Many hole-making applications, formerly requiring drilling or some other costly means, can now be done with R-B interchangeable punches. If you have thought your piercing jobs too tough for interchangeable punches, it will pay you to investigate the wide application potential of R-B standardized equipment.

No other manufacturer of punches and die buttons can offer you the amount of successful application experience and the scope of knowledge that is available from the R-B engineering staff for:

- ★ Cutting Your Production Costs
- ★ Reducing Die Designing Time
- ★ Increasing Productivity of Presses
- ★ Supplying Answers to Piercing Problems
- ★ Saving Die Construction Time
- ★ Complete Standardization of Press Tooling

For Additional Information or Engineering Service, Write to:

RICHARD BROTHERS PUNCH DIVISION
ALLIED PRODUCTS CORPORATION
DEPT. 86 • 26486 CAPITOL AVENUE • DETROIT 39, MICHIGAN

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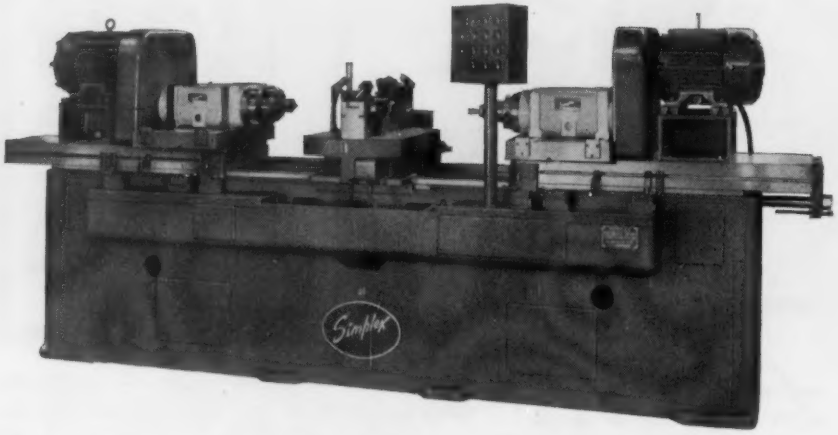
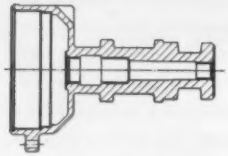
Simplex

PRECISION BORING MACHINES



SIMPLEX 2U 2-Way Hydraulic Feed Precision Boring Machine equipped with four #3 SIMPLEX self-contained and automatically lubricated precision boring heads for finishing a distributor base. The fixture is a two-station hydraulically indexed platen type rotary table with four manually clamped work holding fixtures. Operations performed are indicated by the heavy lines on the piece part.



25TH Anniversary
1932 – 1957

SIMPLEX MACHINE TOOL CORPORATION

4540 WEST MITCHELL STREET
MILWAUKEE, WISCONSIN

PRECISION BORING MACHINES • PLANER TYPE MILLING MACHINES
SPECIAL DRILLING, TAPPING AND BORING MACHINES

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.020 Steel

RACINE

LOW COST...LARGE CAPACITY

Operating Features

1. **HYDRAULIC FEED AND CONTROL SYSTEM**—Pressures are controlled by a single graduated dial. Rate of feed is controlled by a small throttling valve.
2. **SWIVEL VISE** — Quick-acting self-positioning type for cutting any angles up to 45°.
3. **BEARINGS**—Extra large bronze bushings accurately press fitted are used on all rotary shafts.
4. **AUTOMATIC KNOCK-OUT**—Saw frame automatically rises to its highest point and motor is stopped at the completion of each cut.

MODEL 816 UTILITY SAW

A fully automatic hydraulically operated all-purpose saw that will handle the full range of general cut-off work.

Any metal from tough tool steel to mild bars, tubing and structural shapes up to 8" x 16" can be cut with speed and precision.

No clutch, trains of gears, levers or ratchet devices are used. The Racine Model 816 is designed with a minimum of easily accessible precision-made working parts that assure years of dependable operation.

Write for catalog giving specifications on RACINE'S complete metal cutting saw line.

RACINE HYDRAULICS & MACHINERY, INC.

2070 Albert St., Racine, Wisconsin

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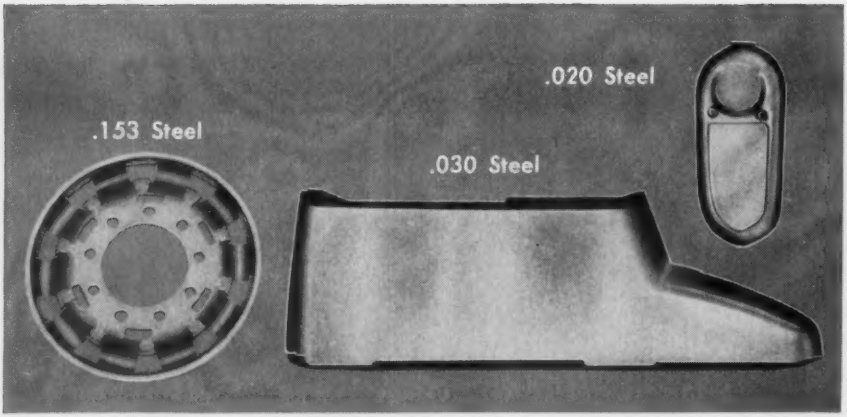

TRIMS SHELLS COMPLETE

Assures Clean, Flat Edges

Slow, costly, multiple "horn" operations, and distorted edges due to "pinch" trimming can be eliminated by a Brehm Die. Operating on principles different than ordinary trimming methods, the Brehm "Shimmy" Die with angular cams causes the shearing edges to cut *four ways in a single* press stroke.

Materials, thickness, shapes and sizes look alike to a Brehm "Shimmy" Die. Whether it's stainless or mild steel, copper, brass, zinc, gold, fiber, silver, aluminum, rubber or plastic, Brehm users are assured of precise production results. Shapes can vary widely, whether a watch case, artillery case, refrigerator door, automotive or aircraft part. Clean, flat, burr free edges are assured. Edge contours can be straight or curved, with multiple notches and projections.

When model changes alter the part design, or if you wish to handle an entirely new part, you only need to substitute cutting adapters.

Submit parts prints of not only the shell to be trimmed but for all related dies for our quotation.

THE "SHIMMY" REG. DIE

Brehm® TRIMMING DIES

SERVICES of YOUR TOOL ROOM in DAYTON

Engineering, Processing, Building . . . . Tools . . . . Dies . . . . Special Machines . . . . Vulcanaire Jig Grinders . . . . Motorized Rotary Tables . . . . Brehm "Shimmy" and related dies . . . . Automation

VULCAN TOOL CO. 732 Lorain Ave. **DAYTON 10, OHIO**

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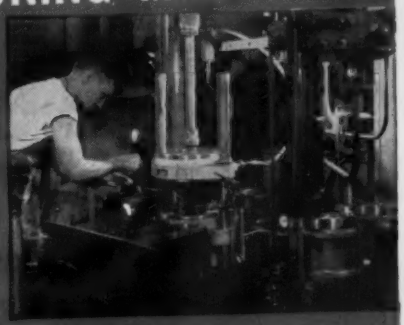
Why Grind or Finish-Bore?

PRECISION HONE!

★ CHEAPER ★ FASTER
★ MORE ACCURATELY

with a FULMER HONING MACHINE!



Switch from grinding or finish boring to Fulmer Honing! There's a double saving: you cut costs and release boring or grinding machinery for other uses.

Fulmer Honing Machines speed production and lower costs. Ruggedly constructed and engineered to handle greater loads than normal. They assure low upkeep under the most severe operating conditions and provide ample cutting power to the stones.

FULMER machines are designed with a minimum number of parts for minimum maintenance. Five basic sizes provide a machine fitted to any needs. Fulmer precision honing

for precision-honing internal bores of ferrous and non-ferrous metals, glass, plastic etc.

usually outperforms conventional grinding or finish boring! Find out how! Write for Bulletin on Honing to: C. Allen Fulmer Co., Dept. S 107 E. 4th St., Cincinnati 2, O.

FULMER honing equipment

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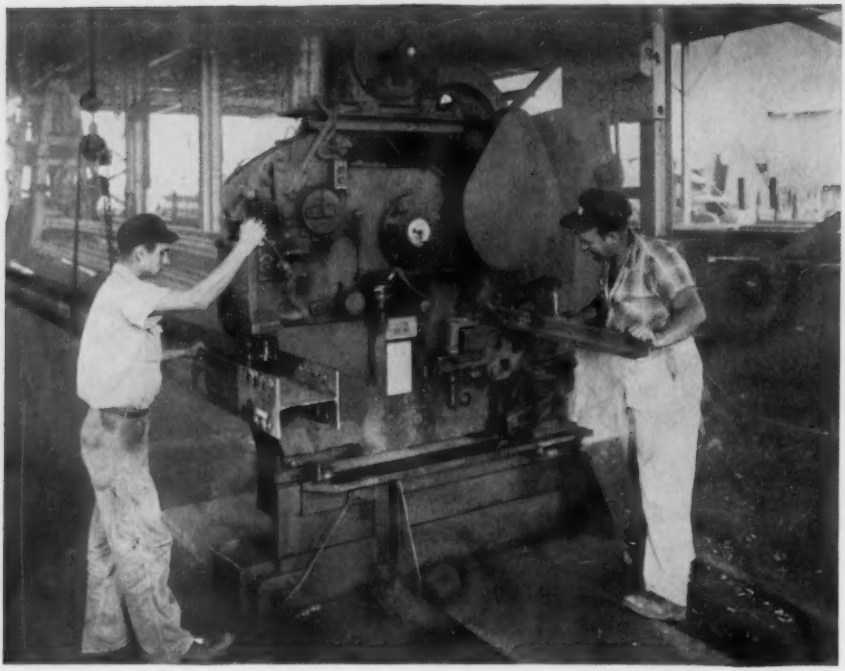

"Buffalo" Universal Iron Worker—up to 6 operations on one machine without tool changes

ADD UP TO 6 PROFITABLE OPERATIONS WITH ONE MACHINE

This shop found their "Buffalo" Universal Iron Worker so much more useful and profitable than existing punch and shear machines that they ordered another —and no wonder. Here's a single husky, rapid-action machine for all your cutting, punching, shearing, slitting, coping, mitering and notching of standard sections—two operations at once. Write today for Bulletin 360 and see how a U. I. W. could be saving space, time and work-conveying in your shop!

In every "Buffalo" product is the "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

388 Broadway Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING

For more data circle 381 on Reader Service Card

The large opening at each corner of the hex is the reason why Apex surface drive socket gets right on the nut, bolt or cap screw. The hex broached opening of the socket matches up perfectly with the hex head of the fastener almost instantly upon contact.

That's why Apex surface drive sockets will help you increase productive output on any high-volume nut running job. You'll keep costs down, too, because the socket drives against the center of the hex flats of the fastener, preventing damage.

Catalog 129—Write, on your company letterhead please, for your copy.

you can get APEX surface drive SOCKETS in these types and sizes:

SQUARE DRIVE	LENGTHS	BROACHED OPENINGS
1/4"	Standard Long Extra Long	3/8" through 5/8"
9/32"	Standard Long Extra Long	3/8" through 5/8"
3/8"	Short Standard (thin or standard wall) Long Extra Long	3/8" through 7/8" 3/8" through 1-1/16"
1/2"	Standard (thin or standard wall) Long Extra Long (thin or standard wall)	3/8" through 1-1/16"
5/8"	Standard Extra Long (thin or standard wall)	7/16" through 1-1/16"
3/4"	Standard Extra Long (thin or standard wall)	1/2" through 1-1/16"

APEX

THE APEX MACHINE & TOOL COMPANY

1027 S. Patterson Blvd. • Dayton 2, Ohio

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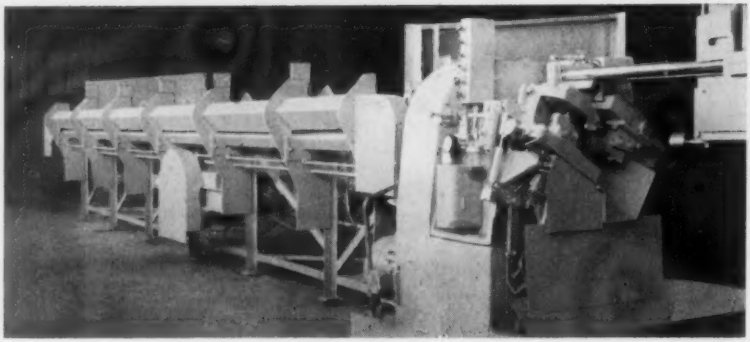
SHREVEPORT • SOUTH BEND • SYRACUSE • WICHITA

For more data circle **382** on Reader Service Card

Why Don't You

GO MODERN?

"Do it yourself" is sometimes rough,
But it keeps the lady trim and lean—
Provided she works hard enough
With a rusty cutting-off machine.



The chances are a woman would put on weight if she were operating the modern automatic Cutting-off Machine and Automatic Stock Feeder. You simply fill the feeder—with random lengths of tubing with diameters up to 8", or bar stock. Then you push the button and take a coffee-break. The operation is entirely automatic from then on.

This machine is fast—accurate—economical.

Write for catalog and full information.

MODERN MACHINE TOOL CO.
2005 LOSEY AVENUE
Jackson, Michigan

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AUTOMATIC COMPENSATION FOR MISALIGNMENT WITH EMPIRE FLOATING TOOL HOLDERS AND TAP HOLDERS

Check These Exclusive Empire Floating Tool Holder Features:

- Automatically compensates for both angular and parallel misalignment.
- Eliminates bell mouthed and over-sized holes—permits extremely close tolerance work.
- Free and easy movement . . . tool holder sleeve and shank float independently of each other.
- Amount of float is infinitely adjustable.
- Smoother running . . . moving parts ride on rollers.
- Minimum of maintenance . . . holder has only five parts.

TOOL HOLDER

TAP HOLDER

Standard equipment with leading Machine Tool Manufacturers. Tool Holders and Tap Holders are available with either straight or tapered shanks.

Check These Exclusive Empire Floating Tap Holder Features:

- Automatically corrects parallel and angular misalignment.
- Designed to prevent freezing under tension—taps float in and out.
- Wide range of float—simple adjustment locknut provides accurate control of degree of float.
- No springs or pivot members to restrict float.
- Floatation feature makes it easier to hold close tolerances.

EMPIRE TOOL COMPANY

8776 GRINNELL AVENUE • DETROIT 13, MICHIGAN

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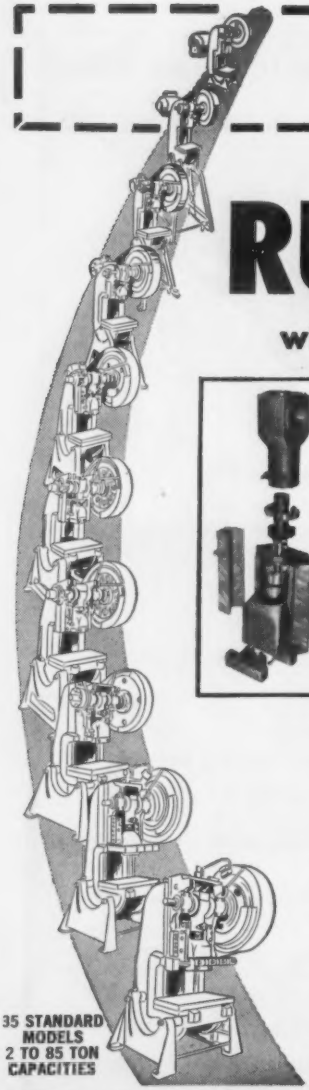
DISCOVER THE *"difference"*

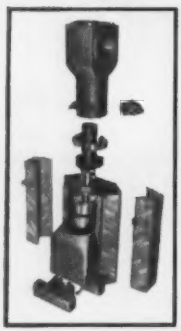
in

RUGGEDNESS

with PRESS-RITE POWER PRESSES



35 STANDARD MODELS 2 TO 85 TON CAPACITIES



- *Heavy semi-steel frame with specially designed reinforcements**
- *Wide main bearings*
- *Oversize crankshafts*
- *Full Vee ramways*

YOU GET MORE PRODUCTION . . . and better production . . . over a longer time because PRESS-RITE Presses are more rugged. *Heavy, semi-steel frame (with built-in steel tie rods on 45, 65, and 85 ton models) . . . oversize crankshafts in relation to press capacity . . . and large bearing surfaces where they are needed for crankshaft and ramway . . . plus many other features, provide the maximum ruggedness in your PRESS-RITE PRESS. Over 35 models, high speed, standard, and backgeared, from 2 to 85 ton capacities.

**WRITE for the new Press-Rite catalog No. 855 with complete information on all models. It's FREE. Write:*

PRESS-RITE DIVISION of

SALES SERVICE MACHINE TOOL COMPANY

2355 University Avenue • St. Paul 14, Minnesota

Used by more . . . for more production

PRESS-RITE

OPEN BACK • INCLINABLE *Power Presses*

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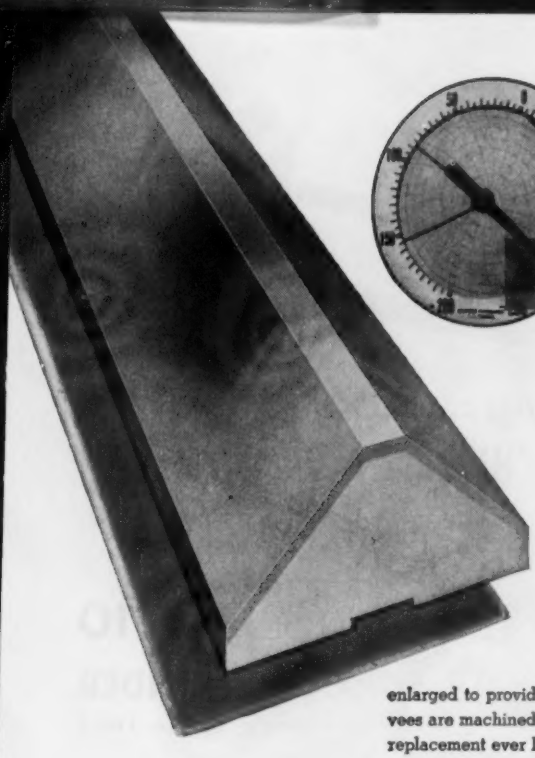
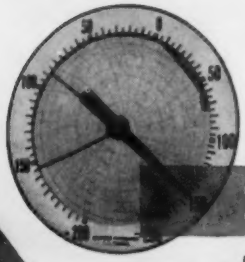




150° BELOW

After hardening to 62 Rockwell C the solid tool steel "AMERICAN" Pacemaker bed vees are stabilized in the deep freeze at 150 degrees below zero.

This freezing treatment not only raises the surface hardness but thoroughly stabilizes the metallurgical structure and prevents twisting or warping.

On the new DeLuxe Model "AMERICAN" Pacemaker the bed vees have been enlarged to provide extra large bearing area for the carriage. The vees are machined to gauge tolerances for interchangeability should replacement ever be required.

This is but one of the outstanding advantages offered by the new DeLuxe Model Pacemaker. Others are illustrated and described by bulletin No. 124—want one?

THE AMERICAN TOOL WORKS CO. Cincinnati 2, Ohio, U. S. A.

LATHES

✻ Pioneered by Covel and first introduced at the 1947 Machine Tool Show. Available on all Covel surface grinders.

Save Re-scraping...Save Money! with COVEL HARD CHROME TABLE WAYS*

COVEL No. 10 SURFACE GRINDER

6"x18" Hand or Power Feed

Engineered to give you the most accurate gage, form tool and surface grinding performance at *low initial cost*. Smooth timing belt drive, hardened and ground lead screws and rigid vertical slide insure precision operation.

Hard Chrome Table Ways Reduce Maintenance Costs

This Covel introduced feature preserves the built-in accuracy of hand-scraped ways for extra years of precision service.

COVEL | PRECISION GRINDERS
BENTON HARBOR, MICHIGAN

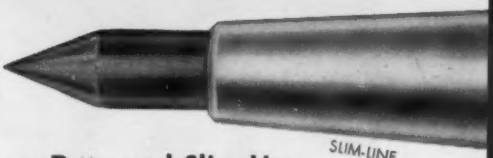
Write for FREE BULLETIN

For all the facts about the rugged low cost Covel No. 10 write DEPT. MM-77.

THE MOST COMPLETE LINE OF SURFACE GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • DRILL GRINDERS • OPTICAL COMPARATORS

For more data circle **387** on Reader Service Card

GREIST **MICRO-SCRIBERS®** mark hard metals fast!



Now in 2 sizes... Heavy-Duty and Slim-Line

Solid carbide tip stays sharper, longer! Scribes fine lines on hardened steel, ceramics, plastics, gems, glass.

Diamond lapped to correct tip angle that gives you fast, easy, close-tolerance layouts.

Hexagonal aluminum body—anodized for extra protection. Packaged in clear "plastic bubble" that protects precision tip.

Order a half-dozen from your Greist distributor today! Specify **Heavy-Duty** or **Slim-Line.** Only **$1.00** each.

THE **GREIST** MANUFACTURING COMPANY
497 Blake Street, New Haven 15, Connecticut
Precision Products since 1871

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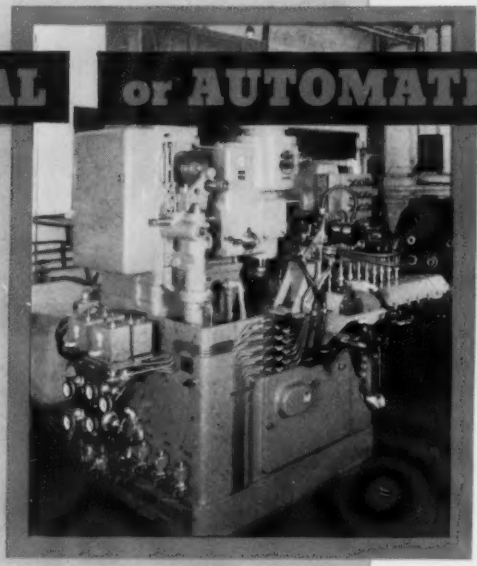
VERSATILE

MANUAL or AUTOMATI



Practically any shaped part in its size range can be cut faster and more accurately on a Fellows No. 4GS Gear Shaper . . . with either manual, semi-automatic or full-automatic operation, depending on your needs!

This production flexibility makes the powerful "4GS" ideal for long runs on similar parts or for short runs of varied jobs. Set-ups are easy and fast. Internal or external spur and helical gears, as well as splines, cams and other irregular non-involute shapes up to 6" P.D. and 2" face width can be cut on this machine. Nine cutter speeds range from 98 to 635 strokes per minute.

The versatility of Fellows No. 4GS Gear Shaper, with manual operation or any degree of automation, can very probably lower *your* cutting costs. Ask your Fellows Representative to show you facts and figures. Write, wire or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N.J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE

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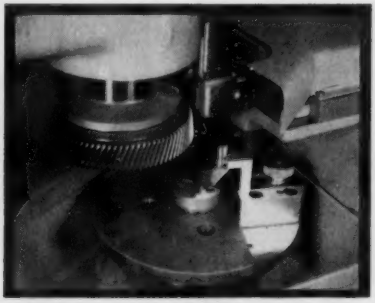
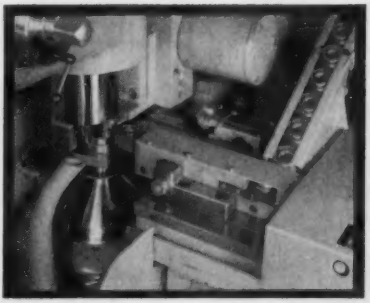
FELLOWS "4GS"

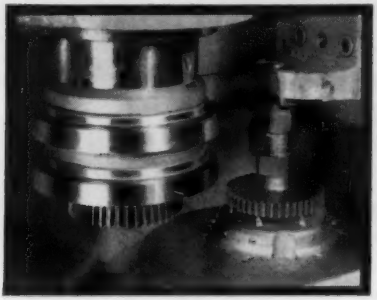
...or anything in between!



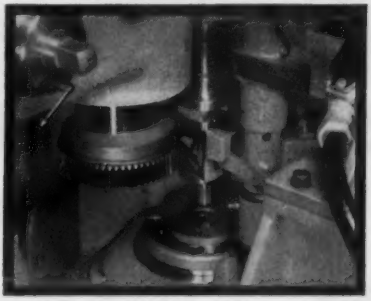
Helical gear cut on a motor crankshaft. Operation can be manual or semi-automatic. Part is held in a bushing at the bottom, an air operated split sleeve support at the top and driven from the connecting rod bearing surface.



Internal clutch parts produced with fully automatic loading and unloading. Part is transferred from loading chute to air operated expanding arbor and teeth are cut. Part is then removed from arbor and transferred to unloading chute while another blank is being loaded.



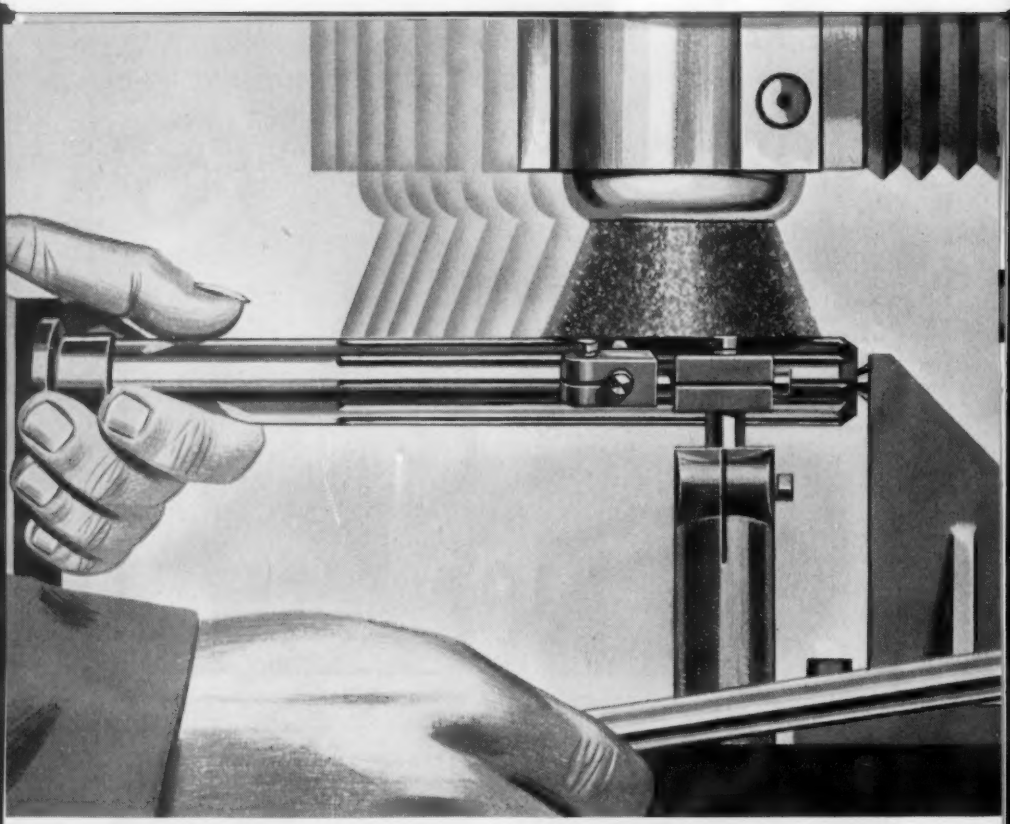
Two cams and a gear are cut at the same time on this gasoline motor part. Cutters are used in tandem and are keyed together to give the required relation between the positions of the cams and the teeth of the concentric gear. Operation is manual.



Automotive transmission cluster gear shaft handled automatically. Air operated "fingers" move shaft into position for automatic chucking and then place finished part in unloading conveyor.

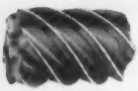
Fellows *Gear Production Equipment*

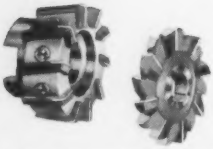
For more data circle **390** on Reader Service Card



Oliver "ACE" Tool and Cutter Grinder

WHEEL TRAVERSES . . . *not the work!*



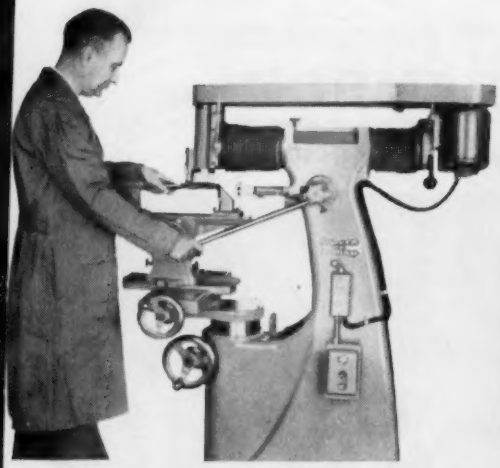


Face mills, reamers, hobs, spot facers—all cutters straight or spiral—are quickly, easily and economically sharpened with the Oliver "Ace."

You can grind tools and cutters more accurately with the Oliver "ACE" because the wheel is brought *to the work*, reversing the usual process. Abrasive dirt and grit cannot cause wear because the cross carriage is not in motion. The horizontal ram which supports the grinding head moves in special bearings and is fully enclosed, sealed against dust and dirt. Further accuracy is assured because the wheel can be trued by a stationary diamond which provides a fixed grinding line. It is not necessary to reset the cutter to compensate for wheel wear.

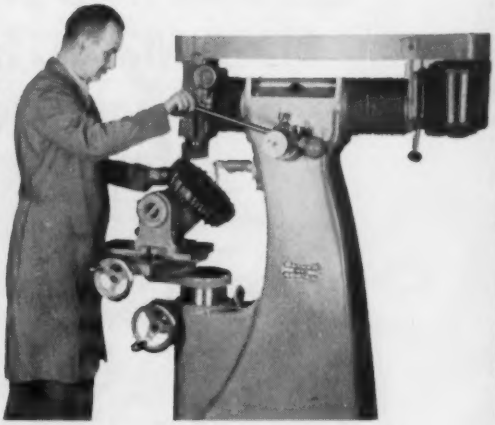
The "ACE" is a universal tool grinder designed expressly for tool grinding—not a general purpose machine *adapted* to tool room work. It is simple to set up. All clearance angles are obtained by direct reading. Operators stand in a natural position with the control lever in easy reach and the work in direct view.

For more data circle **391** on Reader Service Card



OLIVER Standard "ACE"

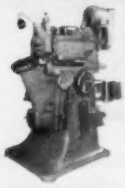
This machine is for high speed and light duty carbide grinding. Only two fixtures are required to handle a complete range of tool and cutter sharpening. Clearance angles are obtained by tilting the grinding wheel the desired amount as indicated on a scale graduated in degrees.



OLIVER Heavy-Duty "ACE"

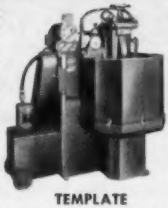
. . . for grinding tungsten carbide cutters and tools in all of their many forms. Because it is for use with hard metals, all components have been designed with rugged going in mind. Like the standard "ACE," grinding is done on the top tooth, not on the side of the cutter. The operator has full vision at all times.

More OLIVER of ADRIAN Tool Grinding Equipment



FACE MILL GRINDER

Completely automatic. A machine tool designed for accurate grinding. Wheel dressed with every stroke.



TEMPLATE TOOL BIT GRINDER

Controlled form grinding for high speed, stellite and tungsten carbide single point tools.

No. 510 DRILL POINTER

Semi-automatic. For drills ¼" to 2" in diameter. No. 21 bench models available for size ½" and smaller.

DRILL POINT THINNER

For low cost reclaiming of drills. Corrects off-center and too-thick webs and out-of-index cutting edges.

DIE MAKING MACHINE

Produces dies, gages, cams, templates, stripper plates, etc. at greatly reduced costs. 5 designs in 2 types.

Just check the coupon for literature on the OLIVER of ADRIAN machine you are interested in. Send it today to...

OLIVER of ADRIAN

OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. • Adrian, Michigan

- ☐ Drill Pointer
- ☐ Face Mill Grinder
- ☐ "Ace" Universal Tool and Cutter Grinder
- ☐ Die Making Machine
- ☐ Drill Point Thinner
- ☐ Template Tool Bit Grinder

NAME_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

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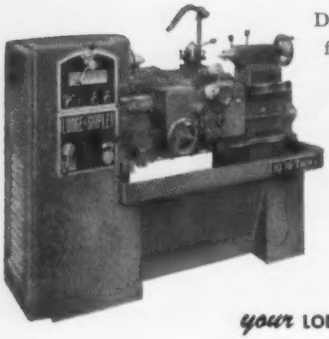
Quick as a...

on a lathe
specifically designed
for production
with accuracy and economy

High speed turning, boring and facing are child's play . . . with the Lodge & Shipley HI-TURN Lathe. Whether on single or multiple-piece work, this 10″ Production Lathe provides productive capacity at a price substantially below conventional lathes.



Designed for fast, convenient operation, it eliminates rarely used features, incorporates many standard features never before found at any cost in a lathe of this size.

The 10″ HI-TURN gives you horsepower, rigidity and production you would normally expect to find in lathes costing twice as much. We can prove more production per lathe dollar . . . more production per operator hour!

Find out how the HI-TURN Lathe fits your turning requirements.

WRITE: LODGE & SHIPLEY, 3055 COLERAIN AVE., CINCINNATI 25, OHIO

your LODGE-*ical choice!*

Lodge & Shipley

1430 E. Maumee St. • Adrian, Michigan

STREET_____

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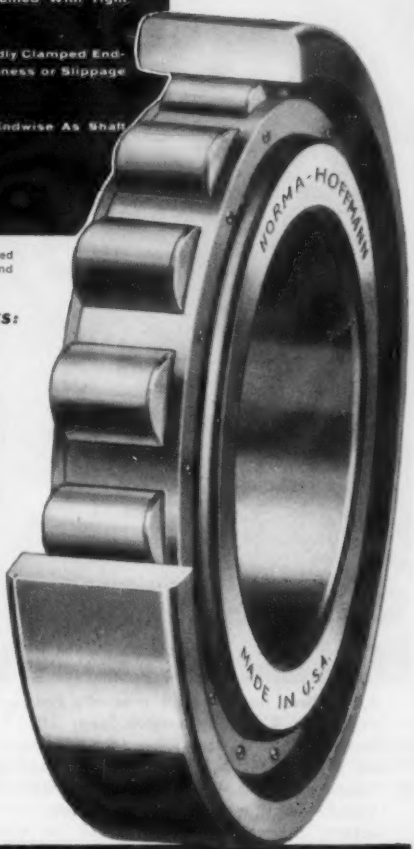
For Shaft Expansion *and/or* Heavy Radial Load

use NORMA-HOFFMANN

Precision Cylindrical Roller Bearings

Outer Ring Mounted With Tight Fit In Housing
Outer Ring Rigidly Clamped Endwise (No Looseness or Slippage in Housing)
Rollers Move Endwise As Shaft Expands

Typical Mounting Using Clamped Ball Bearing At Lightly Loaded End Of Shaft And Clamped Roller Bearing At Heavily Loaded End



CHECK THESE ROLLER BEARING ADVANTAGES:

1. No Looseness Required Between Outer Ring and Housing — As With Self-Contained Bearings.
2. No Possibility of Endwise Cramping of Bearings —A Frequent Cause of Heating and Early Failure.
3. Extra Quiet and Trouble Free Operation — Due to Elimination of Looseness.
4. Extra Heavy Radial Load Capacity Plus Resistance to Shock and Vibration.
5. Precision Limits Used Throughout Permit Extra High Speed Operation.
6. Interchangeable With Standard Single Row Metric Ball Bearings.
7. Available Also in An Extra Light Series Where Overall Weight Js Important.

Norma-Hoffmann Engineers, specialists in bearing design and application, will help you with your problems. Ask for their services.

NORMA-HOFFMANN *Precision* **BEARINGS**

BALL • ROLLER • THRUST

NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT – FOUNDED IN 1911

Field Offices: Atlanta, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Philadelphia, San Francisco, Seattle

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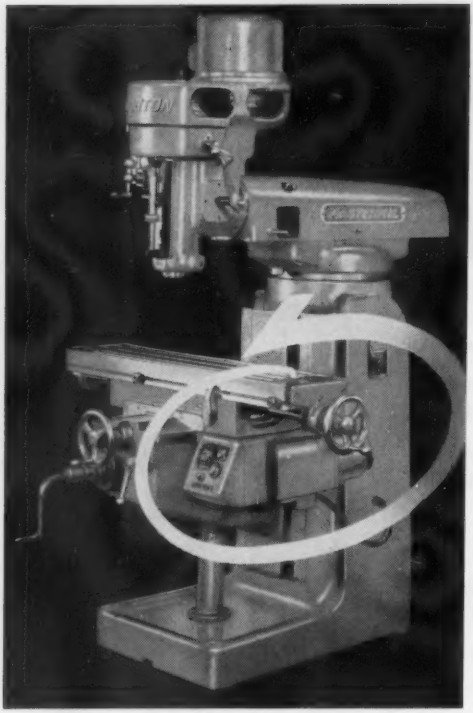
Never before a Milling Machine table drive like this exclusive



2,800 lbs., net — built ruggedly for sustained accuracy. 22" longitudinal feed; 10½" cross feed; 15¼" vertical knee feed. Table, 10" x 42"; saddle is 24". Square lock bearings between column and knee, and knee and saddle. Spindle head swivels; ram increases transverse cutting capacity; Turret provides for other attachments at rear of Ram.

GORTON

electronic

DYNA-DRIVE

Registered Trade Mark

It "thinks" while it feeds with built-in "brain". Automatically adjusts to provide required torque. More sensitive than hand feeding resulting in exceptionally fine finish and longer cutter life.

Spindle has 2 H.P. Motor.

Dual speed range; from 80 to 5,600 R.P.M.; number of speeds, 10; spindle feed, 4". Spindle down feed available. Machine can be furnished as a manually-operated duplicator or with extremely responsive Trace-Master Hydraulic Tracer Control installed as original equipment.

Ask for Bulletin 2699-1707 which completely describes this remarkable machine.

GORTON

GEORGE GORTON MACHINE CO.

1707 RACINE STREET • RACINE, WISCONSIN

SINCE 1893 Tracer-Controlled Pantographs, Duplicators—standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

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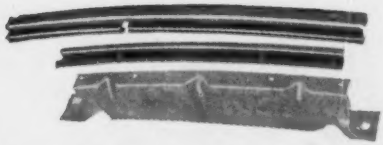
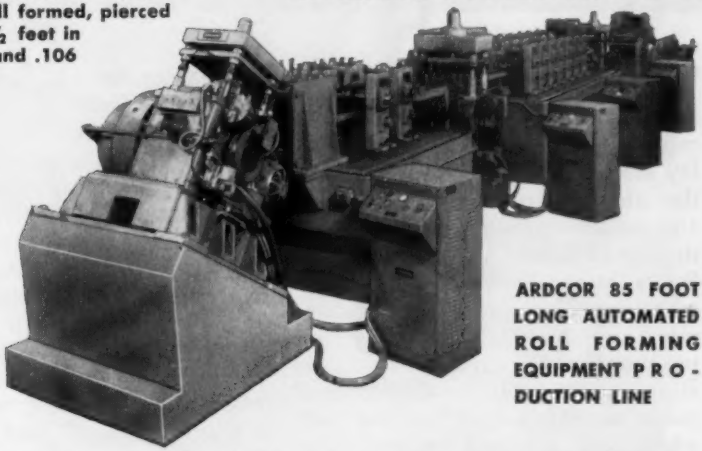
A7-1005

High Speed Roll Forming...TIMED IN SECONDS



Upper and Lower Seat Tracks completely roll formed, pierced and coiled 1½ feet in length; .078 and .106 gauge steels.

. . . UP TO 45 SEAT TRACKS PER MINUTE, Roll Formed, Pierced, Coiled and Cutoff on this ARDCOR Completely Automated Production Line



ARDCOR 85 FOOT LONG AUTOMATED ROLL FORMING EQUIPMENT PRODUCTION LINE

ARDCOR Roll Forming Equipment, now used by one of America's leading Automotive Manufacturers, for roll forming Upper and Lower Seat Tracks for 1957 model cars.

Starting from the coil box (in the background of the photo above), the stock travels at high speed through a succession of operations including Leveller, First Pre-Notcher, Forming Mill Passes, Second Pre-Notcher, Two-Drive Coiling Fixture, to the Cutoff Press shown in the foreground. Four Pulpit Control Stands are located at the two Pre-Notching Stations, Forming Mill, and Cutoff Press, giving the operators completely automated or emergency control at every station.

Throughout the metal working industry, modern roll forming methods are giving faster production with new and important economies. Let ARDCOR standard or special design Roll Forming Equipment introduce these new and improved production advantages in your plant.

Consult our Engineering Facilities without obligation . . .

***American* ROLLER DIE CORP.**

29590 Clayton Avenue -:- Wickliffe, Ohio

ARDCOR Engineered MEANS BETTER COLD ROLL FORMING

DESIGNERS AND MANUFACTURERS: All Sizes and Spindle Diameters of Roll Forming Machines, Welded and Lock-Seam Tube Mills • Forming Rolls, Tubing and Pipe Rolls • Straightening, Pinch and Leveller Rolls • Cut-off Machines

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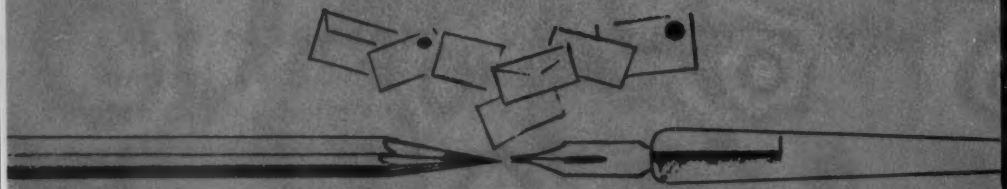
OVER THE EDITOR'S DESK . . .



THROUGH VIEW

A revolutionary new X-Ray that can analyze a given element in alloy steel in 10 seconds, or magnify the atomic structure of materials 150 million times has been installed in the metallurgical laboratory of Buick Motor Division. The instrument is a Spectrometer-Diffractometer and Micro-Radiography apparatus that fires a 50,000 volt X-Ray beam to probe inside hardened steels, or even carbide cutting tools which defy analysis by any other means.

Used as a Spectrometer, it can determine the exact percentage of manganese molybdenum or any other metallic element in a steel bar or roll to insure that the composition of the material meets quality standards. As a Diffractometer, the instrument magnifies atomic structure to the extent that the arrangement of atoms in a piece of steel can be visualized. That makes it possible to predict whether or not the part has the required wear and strength specifications.

In its simplest terms, the instrument works like this: Intense X-Ray beams are directed at the sample to be tested. Each element in the sample reflects those beams at a different angle. Since the reflection of every element is a known and constant factor, it is possible to check the presence of any element by simply testing for reflection at its particular angle.

The amount of intensity of reflection varies in an established proportion to the amount of the element in the sample. By simply measuring the amount of reflection at a given angle, it is possible to determine the quantity of that element. A proportional counter, similar to a Geiger detector tube, is used to locate and measure reflection.

One of the biggest advantages of the instrument is that it can be used in quickly and accurately testing for a variety of characteristics in a part without the necessity of destroying the part in the process.

★ ★ ★

EDUCATION

Today, a college education costs money—lots of money. According to a recent New York Times survey, the average cost of one college year this past year was $1770, including only $350 for personal expenses,

why buy two machines for external and internal grinding?

Hydraulically operated table with speeds from 3' to 50' per minute. Quill type spindle, lifetime lubricated ball bearings. Work speeds from 50 to 500 rpm. Table surface 6" x 50". Cabinet base design for maximum stability. One shot lubricating system.

GRAND RAPIDS — *does 'em both!*

Universal Cylindrical and Internal Grinder, No. 1230

It's perfect for plants having a variety of internal and external grinding, but not enough of each to require individual machines.

Write for illustrated book with complete details.

GALLMEYER & LIVINGSTON COMPANY
408 Straight St., S.W., Grand Rapids, Michigan

GALLMEYER & LIVINGSTON

travel, and so on. The cost last year by comparison was $1320. These present costs range from a high of $2100 to a low of $900 for a resident of South Dakota who attends the State University.

Can the investment be justified? The U. S. Census Bureau reports that the average lifetime earnings of the college graduate are $268,000, while the comparable figure for the high school graduate is $165,000. The Federal Reserve Board made a study which showed that in the 25 to 34 year age bracket, four times as many college graduates as high school graduates are earning $10,000 or more per year. Certainly, a good return can be shown on the investment and certainly it would be well to encourage college attendance for any young person qualified to continue his education in the schools of higher learning.

★ ★ ★

OPERATING BUSINESSES

According to a recent study made by Dun's Review and Modern Industry, our economy needs one business concern for approximately every 40 people. In 1929 we had one business concern for every 40.2 people; in 1939, one for every 40.6; in 1949, one for every 37.3; and in 1955, one for every 39.1. The study indicates that 4.50 million concerns will be in operation by 1960; 4.90 million by 1965; 5.25 million by 1970; and 5.75 million by 1975. This business growth is said to be intimately linked to today's population upsurge. On an average day in 1957, more than 11,500 American babies will be born: more than 4,300 marriages will take place; and approximately 4,300 Americans will die. Each such average day in 1957 will bring a net increase in our population of almost 8,000.

★ ★ ★

AUTOS AND PROGRESS

At the recent dedication of Ford Motor Company's new Proving Ground near Romeo, Michigan, Ford vice president of engineering and research Andrew Kucher noted that scientists in the next few decades will have learned so much about the structure of matter that it no longer will be necessary to adapt systems to materials. The engineer will write a prescription for a material and hand it to a metallurgist, who will compound the material in a fashion reminiscent of the modern pharmacy.

Predicting the development of intricate machines for such functions as the translation of languages, Mr. Kucher also foresees the time when an engineer or scientist will be able not only to dial into a machine for a bibliography of references on a subject of interest to him, but also to push a button and have a transcription presented to him.

Theoretical strength of present-day steels may be raised from 100,000 pounds per square inch to 1,000,000 pounds per square inch, result-

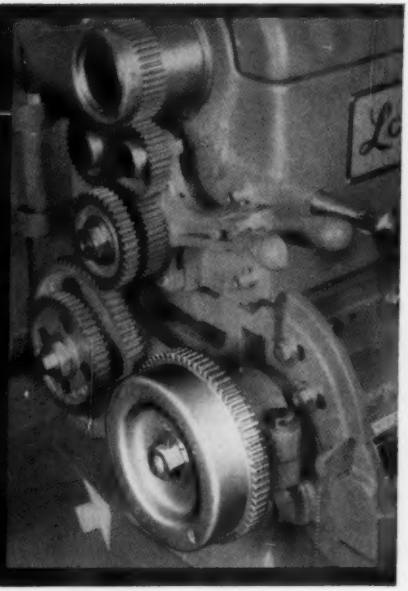
Advanced Design at Work

Automatic Safety Gear

guards *Logan* Lathes

against gear train

overload damage



12" Swing No. 2525-V
Logan Screw Cutting Lathe

Brief Logan Lathe Specifications
SWING, 14⅝" down to 9" . . . CENTERS, 40" to 17" . . . COLLETS, 1" to ½" . . . SPINDLE BORE, 1⅛" to 25/32"

Advanced Design Features
Ball Bearing Headstock . . . Variable Speed Drive on larger models . . . Double V-Belt Drive on smaller models . . . Automatic Safety Gear . . . Precision Carriage . . . 2-V-way, 2-flat-way precision ground bed, furnished flame hardened at small additional cost.

■ Gear trains on Logan 14" and 12" Lathes are doubly protected. Extra strength, width and weight give inherent resistance to wear and hard use. In addition, they are equipped with a safety gear that neutralizes sudden overload shocks. Automatically disengaging if the carriage or tool jam up, the safety gear "clears the circuit" like a fuse, reducing the threat of breakage to all gears from the spindle through the quick change gear box and into the carriage.

The safety gear typifies Logan advanced design and thorough construction. The Logan ball bearing spindle, variable speed drive, precision carriage and rugged, accurate bed are further reasons why you can depend on a Logan Lathe for exacting high speed production and second operations. Ask your Logan dealer for details, or write for the Logan catalog.

LOGAN ENGINEERING CO.

4901 WEST LAWRENCE AVENUE, CHICAGO 30, ILLINOIS

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OVER THE EDITOR'S DESK . . .

ing in lighter and stronger structures. High temperature materials for use in the range of 2,000 to 3,000 degrees Fahrenheit undoubtedly will be developed. Future use of inorganic materials will be limited largely to four metallic elements —iron, aluminum, magnesium and titanium; and one semi-metal — silicon, for major construction.

New furnaces with temperatures in excess of 10,000,000 degrees will be available to metallurgists. By means of these new furnaces, scientists will be able to take a common material such as sand, break it down, and resynthesize it into substances of desired structural and electrical values.

★ ★ ★

MILLION DOLLAR LATHE

In 1942 Thompson Products Co., Inc., of Cleveland bought a lathe. The cost was $12,000. Under Federal tax laws the cost could be depreciated over a 14-year period. So, last year, when the lathe had to be replaced, Thompson had the $12,000 set aside, plus an additional $1,000 which was the resale value of the old lathe.

However, in 1956 the same model lathe that had previously sold for $12,000 in 1942 was selling for $35,000, and a new model with attachments to meet the advanced need of the industry cost $67,000.

So the company found itself with only $13,000 with which to buy a $67,000 piece of equipment.

The additional $54,000 had to come from profits. But in order to clear $54,000, Thompson had to make a profit of $112,000 before taxes, and in order to make that much profit, the company had to sell more than $1,250,000 worth of products to customers.

It took a million and a quarter dollars of sales for the company to replace one lathe, and not one cent went to the stockholder.

A million and a quarter dollars to replace one machine so three Thompson employees—one shift—could continue working.

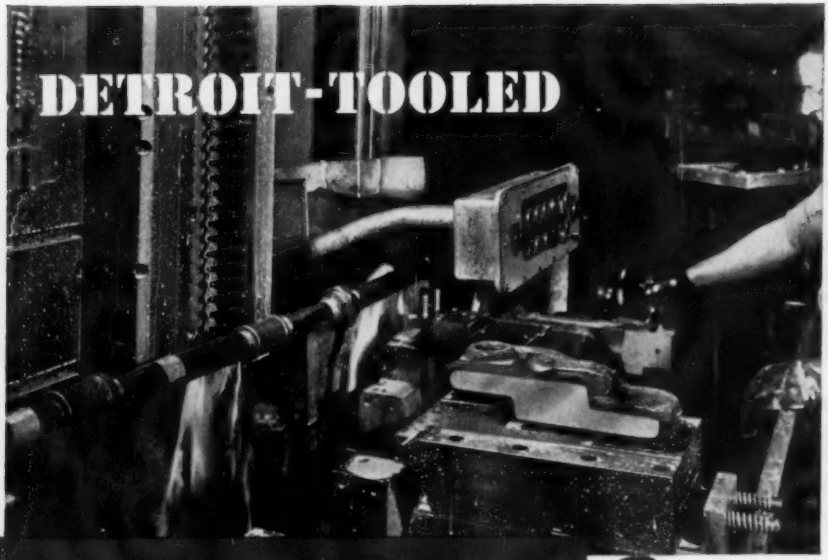
This is something to think about when the agitators scream about high corporate profits. No profits, no new machines, no jobs.

★ ★ ★

Letters to the Editor:

Press Mechanization

In your March issue there is a very interesting article under the heading "Power Press Mechanization with Safety." As I have been working on safety devices for presses many years, I should like to know some more details. For instance, the author says on page 104 second column line 6 from bottom: "On the punch press, the recommendation across the board was either to install friction type conversion clutches or to replace the presses . . ." Now, what kind of clutches does the author mean? What good do these clutches do if



Broaches 4 Faces Every 24 Seconds!

These tough forged steel track links, used on a heavy tractor, must be machined to close tolerances at high production rates. This requires well-designed, hard-working tools and fast-acting precision fixtures.

The machine is tooled to completely broach a part at one slide while the fixtures at the other slide are unloaded and reloaded. Each slide has two fixtures. At the right, parallel sides and locating slot are broached. At the left, a keyway is broached, positioned from the locating slot.

Let Detroit Broach offer the solution to your production machining problem, including the right machine, the most efficient tooling, and automation to any degree required. Send parts, prints or details of your problem for prompt recommendations.

OPERATIONS

PART—Forged steel track link, Rockwell C32-38.

MACHINE—Detroit Vertical Twin Slide, 25-ton 100-inch stroke.

OPERATIONS, EACH SLIDE
Station 1: Broach locating slot and parallel sides; Station 2: Broach keyway (One slide broaches during unload and reload at other.)

STOCK REMOVED
Approximately 5 cu. in. per part. Hourly removal is 225 pounds.

TOTAL BROACHING TIME PER PART
24 seconds.

DETROIT BROACH & MACHINE COMPANY

DEPARTMENT K-7 • ROCHESTER, MICHIGAN

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OVER THE EDITOR'S DESK . . .

the flywheel has started to turn the crankshaft of the press and thus pushing the slide or ram down? Is it possible to stop the ram anywhere on its downward stroke if a man or woman have their hands between the tool-halfs?

Will you also please tell me who makes new presses equipped with these friction or conversion clutches that are supposed to effectively prevent accidents?

A. E. Fristedt, Superintendent
Firm Elbastu
Beckombergavagen 85
Stockholm-Bromma
Sweden

● *On all presses having positive clutches, a flywheel or bull gear rotates continuously on the end of the press crankshaft. The clutch, which is built into the hub of the bull gear or flywheel, engages this rotating member with the crankshaft and turns it through an uninterrupted 360 degree cycle before the crankshaft is mechanically disengaged from the driving member. This arrangement is hazardous because the press cycle cannot be interrupted once it is started. A conversion clutch-brake assembly is an air operated friction clutch plus a brake built up on a tubular clutch shaft. This clutch shaft mounts on the original intermediate drive shaft of the press, the drive shaft passing through the clutch and with the two keyed together.*

The press drive motor is rearranged to directly drive the clutch-brake unit which has "V" belt grooves machined in its outer housing for that purpose. The original drag brake used with the positive clutch is removed and the flywheel or bull gear employed as a driving member in the positive clutch is keyed to the press crankshaft. The new clutch-brake assembly serves as a flywheel and turns on the clutch shaft which is keyed to the original intermediate drive shaft of the press. When the clutch is engaged, the clutch shaft is driven, which in turn drives the intermediate shaft, bull gear and crankshaft. When the clutch is disengaged, the brake, which is spring actuated and linked to the clutch mechanism, stops and holds the clutch shaft, locking the drive mechanism and holding the press slide.

In conjunction with these clutches, we use Clark air-electric press controls arranged in such a manner that each man working on the press must hold two palm buttons depressed, one with each hand, until the dies are closed. After the dies are closed, the hands may be removed from the buttons and the press cycle will continue to its completion. However, if a hand is removed from any single palm button before the dies close, the press slide will stop because removing a hand from any palm button in the control circuit exhausts the air from the clutch cylinder which causes it to disengage and actuate the brake.

Several American press builders supply these clutches and they can be used on all positive clutch presses where an intermediate shaft is employed in the original press drive

Now...an answer to Summer Rancidity!

Anaerobic bacteria are ready for their annual *summer feast!* Their favorite dish—water-mix cutting and grinding fluids, and their calling card is rancidity. They cost you plenty in the past, by destroying the stability of soluble oil long before the end of normal service life.

But here's a way to put an end to this familiar machine shop free-loader! Switch to a Stuart Heavy-Duty Water-Mix cutting and grinding fluid with *anaerobic bacteria inhibitor*. Solvol "X," Codol "X," Dasco Super Soluble "X" Base, and the new Dasco D-20 are *guaranteed to stay sweet three to four times* longer than other products on the market—*even in hot weather and through long shutdowns.*

Try them on a 100 per cent moneyback basis. Ask your Stuart Service Center to recommend the water-mix compound best suited to your jobs.

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CODOL "X" • DASCO
SUPER SOLUBLE "X" BASE

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METALWORKING LUBRICANTS

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OVER THE EDITOR'S DESK . . .

arrangement. Our presses are Toledo, Consolidated and Bliss and we used Cleveland clutches as conversion units.

Regarding press builders making new presses with friction clutches, all American press builders supply them. In fact, there are very few presses built in America today with positive clutches.

From your comments, I would gather that you are attempting to work out a device or devices to make it possible to interrupt the press cycle after it has started and are trying to accomplish this with no basic change in the positive clutch. To my knowledge, this approach has never been successful. In fact, we explored that possibility very thoroughly before we decided on the new friction type conversion clutches.—J. Robert Stone

Please Send

Please send me tear sheets from the May, 1957 issue of *Modern Machine Shop* covering the articles, "Training Tomorrow's Technicians" and "Automation Demands Perfect Communication."

John Kiefer, Plant Manager
Reynolds Metals Company
Arkadelphia, Arkansas

In your April, 1957 issue of *Modern Machine Shop*, I found an article of great interest which, if possible, I would like to obtain copies. The article to which I refer is entitled "How to Develop Cooperative Team Work," by Alfred M. Cooper. I would need about a dozen copies complete with the cleverly drawn cartoons.

R. W. Reichard, Production Superintendent
The Leece-Neville Company
5109 Hamilton Avenue
Cleveland 14, Ohio

Will you please send me a reprint of the article "Clinometers and Their Application" which appeared in the December, 1955 issue?

W. H. Berg
Missiles Production Section
General Electric Company
Burlington, Vermont

Will you please send me two sets of tear sheets of the article, "How to Develop Cooperative Team Work," which appeared in the April issue of *Modern Machine Shop*?

C. B. Stahlberg, Chief Process Engineer
Bell and Howell Company
7100 McCormick Road
Chicago 45, Illinois

Would you kindly send me two copies of the article "Special Machine Shop for Small Parts Production" which appeared in the January, 1957 issue of your magazine?

Charles Bunty, Methods and Data
Westinghouse Electric Corporation
Lester Branch P.O.
Philadelphia 13, Pa.

We have a copy of the booklet entitled "Let's Take a Look at Distribution," which is a reprint from *Modern Machine Shop*. We would appreciate your advising us if these can be secured in quantities, also quantity prices.

Joseph J. Badalli, President
Standard Equipment & Supply Co.
534 Michigan St.
Hammond, Indiana

New

ARMSTRONG

Armide CARBIDE INSERT TOOL HOLDERS

Embody... Convenience, Economy Simplicity and Strength based on these superior features:

- **IMPROVED CLAMPING METHOD — speeds indexing of Inserts.**
- **REPLACEABLE SEAT of Hardened Tool Steel — protects shank and provides flat base to prevent damage to inserts as they are clamped in position.**
- **SHANK of Heat Treated Alloy Steel — gives extra strength and rigidity.**

A slight turn of a single screw permits rapid indexing of the ARMIDE insert — reducing down time to a minimum.

The use of ARMIDE "throw away" inserts provides the economy of multiedged inserts — triangular inserts have six, square inserts eight cutting edges. These are available in Utility or Precision finish and in three grades of ARMIDE: 350, 370 or 883.

Protection to the shank is given by the replaceable tool steel seat which prevents wear and damage to the shank and provides a flat base for the insert reducing the possibility of damage to the insert as it is clamped in place. A relief groove is ground into the seat providing clearance when a dulled insert with "built up" edges is turned over.

ARMSTRONG ARMIDE Carbide Insert Tool Holders are furnished in two styles and three sizes. Complete data on these tools is given in Bulletin CIT, mailed on request.

Buy ARMSTRONG TOOLS from your Industrial Distributor

Write for catalog

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

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The article to which I refer is en-

Hammond, Indiana

Planning for R

Here the author offers three practical suggestions which could be included in any program that is designed to combat obsolescence.

By J. F. RANDALL
Director, Manufacturing Engineering Office,
Ford Motor Company, Detroit, Michigan

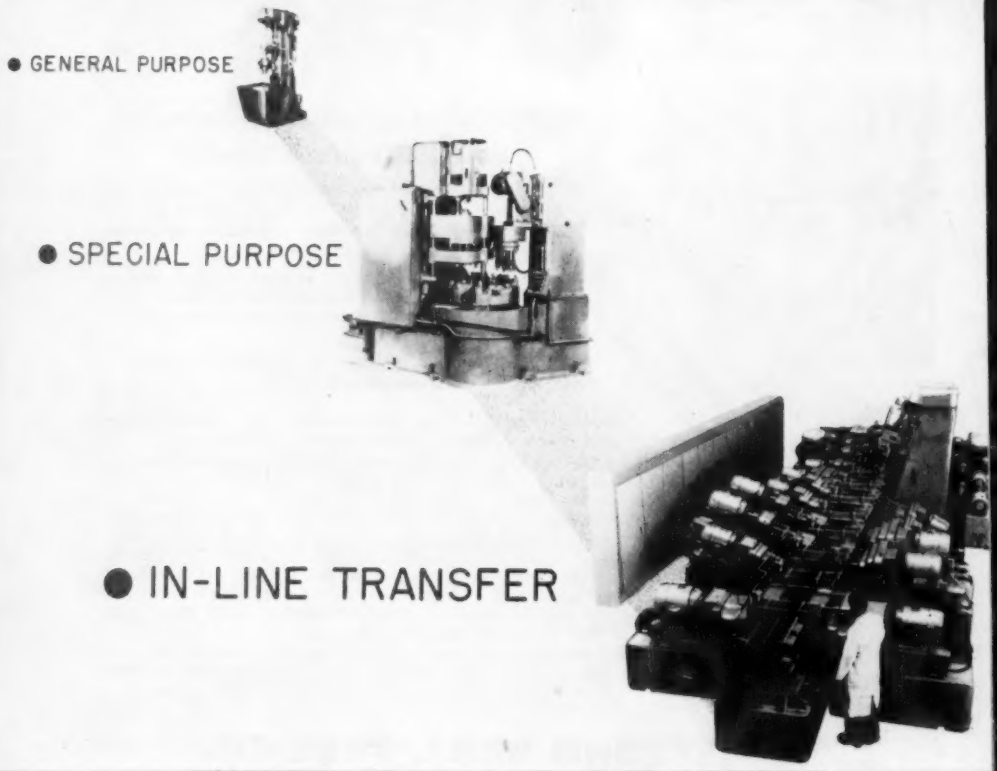

Fig. 1—In automotive industry, trend has been toward special-purpose and in-line machines.

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for Reduced Obsolescence

Planning for Reduced Obsolescence is a subject of interest at almost any time but it is a subject which has commanded an increasing amount of attention, particularly since the end of World War II because the cost of obsolescence of facilities has become a major industrial problem. It can be related with a fair degree of certainty that the experience of the Ford Motor Company during this period is probably typical for the automotive industry. Altogether, the announced projects in Ford's postwar expansion program include 39 new manufacturing and assembly plants, 21 parts depots, two proving grounds, and 19 engineering, research, and office buildings.

In this country alone, the total cost of this expansion, modernization, and tooling program will exceed $4 billion when currently planned projects are completed. A significant percentage of this sum will be devoted to new machine tools and related equipment. Unfortunately, because of product changes, many of these new facilities will be disposed of long before they are worn out or fully depreciated.

Years ago, the automotive industry used general-purpose machines to produce many parts. At that time, model changes occurred infrequently, with a majority of these changes confined to body stampings. The same basic engine and chassis parts were used for several years. Accordingly, there was very little obsolescence of the old general-purpose machinery. Most of these machines were used until they were worn out. Then followed a period of more recent date when, as a result of requirements for increased production volumes and lower costs, the automotive industry adopted special-purpose machines, as shown in Fig. 1. These machines were capable of greater productivity, but were less flexible and more costly than the earlier general-purpose machines. Unfortunately, frequent product design changes obsoleted many of these special-purpose machines long before they were near the end of their productive lives.

To obtain still greater machine productivity and improved quality, in-line machines are now widely used which transfer parts automatically from one station to another. Most of the present versions of these machines are even less adaptable to changes in part design than were the previously used special-purpose machines. To further complicate the obsolescence problem, product design changes now occur much more frequently. In fact, sig-

Fig. 2—Old and new engine intake manifolds.

Fig. 1—In automotive industry, trend has been toward special-purpose and in-line machines.

". . . for the automotive industry, certain estimates place the total cost of obsolescence at about $320,000,000."

nificant improvements are made in chassis, engine, and other power-train components almost every year.

Although specific obsolescence cost data for the automotive industry as a whole is not available, certain estimates which we feel are reasonable place the total cost of obsolescence at about $320,000,000. During the past three years, the cost of facilities actually retired is estimated to be approximately $80 million. During this same period, product design changes in the industry have required an expenditure of an estimated $240 million additional to rework existing facilities and purchase new machines. This outlay of over $300 million in the automotive industry during a three-year period requires that management carefully consider all possible methods of reducing the cost of future obsolescence.

In the automotive industry, obsolescence is greatly increased by frequent product changes. As an example, when Ford introduced a new engine a few years ago, the intake manifolds for the old and new engines were significantly different, as shown in Fig. 2. Let us consider the effect of these design changes on production facilities for this one part. In Fig. 3, upper left, we see a portion of the line used to manufac-

Fig. 3—Illustration showing effect of model change on manifold production facilities.

obsolescence of the old general-pur-

Fig. 2—Old and new engine intake manifolds.

ture the old intake manifold; this line of machines was originally purchased at a cost of over $750,000. In order to make the new part, it was necessary to abandon these machines. The net retirement cost, after considering depreciation, dismantling cost, and salvage value amounted to over $500,000. In other words, in just a few years, sixty-six per cent of the original cost of these machines was lost due to obsolescence. In Fig. 3, center, we see the area after the old machines had been torn out and foundations installed for the new machinery. At the right we see the new in-line transfer machines after installation. Complete with hydraulic, pneumatic, and electrical control systems, and installation, these particular machines cost almost $2.5 million.

Abandonment of the original machines plus purchase of the new units resulted in a total cost of approximately $3 million for just this one engine component. Expenditures for new facilities do not end with the procurement of machines for new designs. Engineering design changes are often made in a new part even before it is in production.

In Fig. 4 are shown two views of the intake manifold for another new model engine, and a view of the in-line transfer machine that was purchased and installed to produce this new part. The letter "A" in both the upper and lower views indicates a change made in this part after the original engineering release and the procurement of the transfer machine.

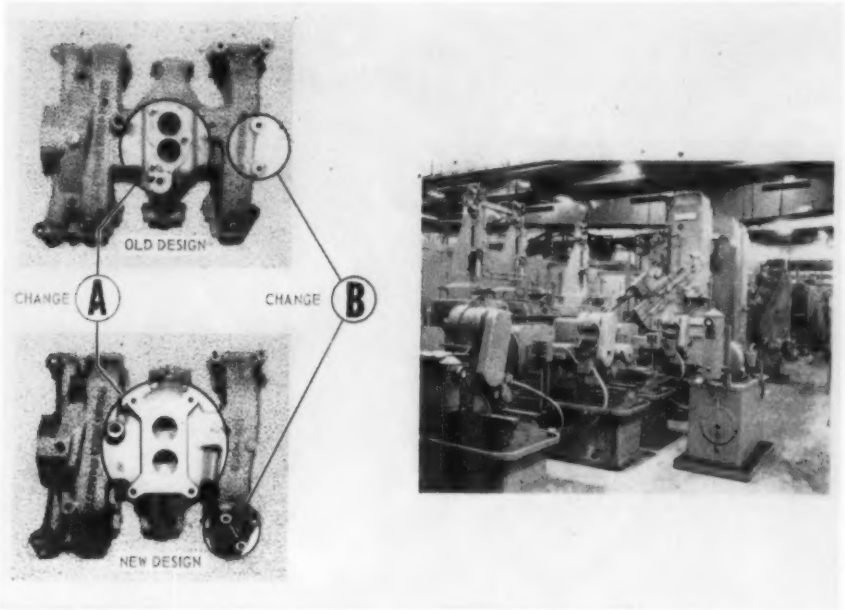


Fig. 4—Illustration showing the effects of engineering changes on obsolescence.

Fig. 3—Illustration showing effect of model change on manifold production facilities.

"In the past, engineering design changes have obsoleted major sections of new machines."

The change calls for four carburetor mounting holes to be drilled and tapped in place of three in the old design. This change required the rearrangement and addition of heads and tools at the drilling and tapping stations in the new machine line. Occasionally it is possible to make such a change in facilities at an additional cost but without delaying program dates.

The type of engineering change illustrated at "B" can have more serious consequences. Where it becomes necessary to drill and tap holes at a different angle, the design change cannot be accommodated by simply changing the heads on the machines. Columns and wing sections are usually involved and sometimes even the machine bases. The inflexibility of many in-line transfer machines adds greatly to the costs incurred in making engineering changes of the type shown at "B."

In the past, engineering design changes have obsoleted major sections of new machines. In addition to the cost of replacing the affected facilities is the high cost of the emergency measures which must be taken to stay "on schedule" for new model production. This may require

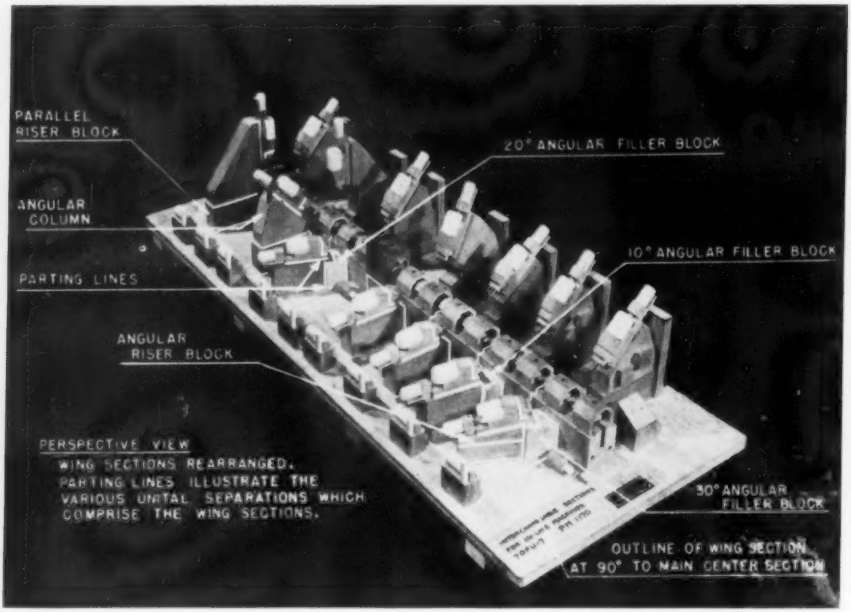

PARALLEL RISER BLOCK
ANGULAR COLUMN
PARTING LINES
ANGULAR RISER BLOCK
20° ANGULAR FILLER BLOCK
10° ANGULAR FILLER BLOCK
30° ANGULAR FILLER BLOCK
OUTLINE OF WING SECTION AT 90° TO MAIN CENTER SECTION
PERSPECTIVE VIEW
WING SECTIONS REARRANGED.
PARTING LINES ILLUSTRATE THE VARIOUS UNITAL SEPARATIONS WHICH COMPRISE THE WING SECTIONS.

Fig. 5—Illustration showing the "building block" concept of in-line transfer machines.

Fig. 4—Illustration showing the effects of engineering changes on obsolescence.

use of temporary off-line operations. Such operations usually disrupt the layout of the department involved, and nearly always result in reduced efficiency and increased cost. Frequent product design changes and the relatively inflexible characteristics of many of our present machine tools are among the factors causing high obsolescence in the automotive industry.

At this point, it may be well to ask the question "What can we do about it?" Although the answer undoubtedly lies in good planning, I should like to suggest certain steps that might be taken to reverse the trend toward higher and higher costs for machine tool obsolescence and production down time.

One such step involves the "building block" concept, as shown in Fig. 5, and illustrates what can be done to increase the flexibility of the present highly specialized in-line transfer machines currently used in industry. In the "building block" type of in-line transfer machine, the mounting surfaces for such major components as vertical and angular columns, wing bases, and main bases would be standardized dimensionally. Appropriate dimensional standards can be developed for each of the various horsepower ranges of drive units normally encountered. This type of design permits components or units to be added to, removed from, or interchanged with, other components or units of the basic machine.

This idea is not new to individ-

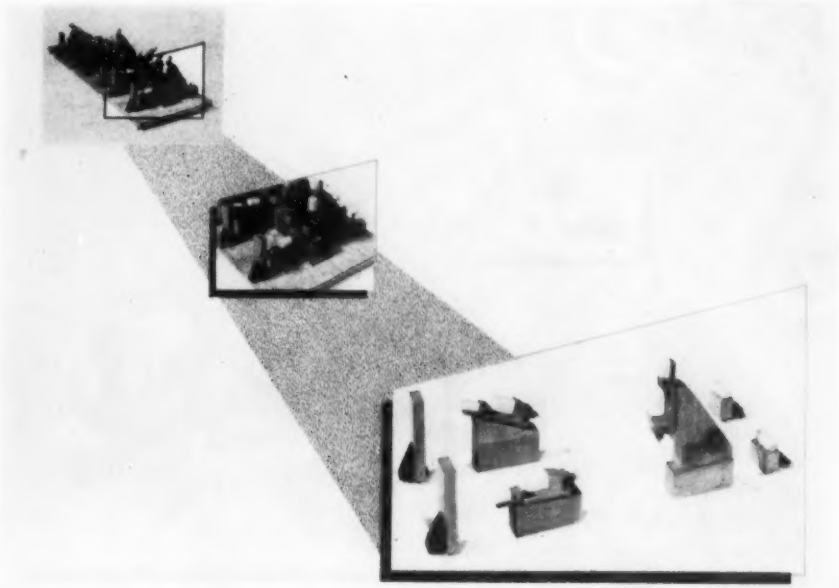


Fig. 6—Illustration showing interchangeable components of in-line transfer machine.

Fig. 5—Illustration showing the "building block" concept of in-line transfer machines.

"Machines utilizing interchangeable components will go a long way toward reducing the present high cost of obsolescence."

ual machine tool builders; however, each company has its own standards. It is nevertheless interesting to note that there is often a remarkable similarity in dimensions of mounting surfaces when comparing units produced by different companies. This concept would provide in-line transfer machines of much greater flexibility. Machines utilizing interchangeable components will go a long way toward reducing the present high cost of obsolescence.

Fig. 6 illustrates further what is meant by interchangeable components of in-line machines. In the upper left is another view of our "building block" model. It represents a complete machine. The middle view gives us a closer look at three units of this machine, and the lower view shows these units removed from the machine itself. The angular, vertical, and horizontal columns, and the bases of these units, are interchangeable with similar components of the other units of the transfer machine.

An extension of the interchangeability of in-line transfer machine

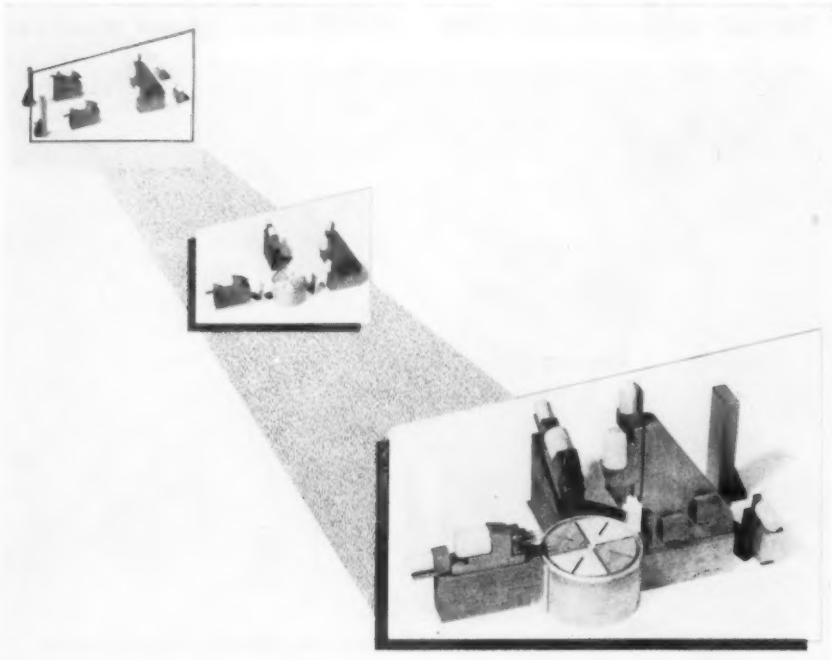


Fig. 7—Interchangeability of in-line transfer machines extended to dial-type machines.

Fig. 6—Illustration showing interchangeable components of in-line transfer machine.

components to other types of machines is illustrated in Fig. 7. While in-line machines represent an increasing portion of the facilities of the automobile industry, it is also true that many parts do not lend themselves to the use of in-line machines. Such parts require other types of special-purpose machine tools. A long step toward reducing obsolescence costs and the time of model changeover could be taken by extending the interchangeability of major in-line machine components to these other types of machine. An example of how this can be done is shown in the middle and lower views. By adding an indexing table and filler blocks to the original group of in-line machine components, we could assemble a dial-type machine. This machine, composed of interchangeable components, would be much more flexible than its present-day counterpart.

A further application of the "building block" concept, using the same basic interchangeable components already discussed is illustrated in Fig. 8. Addition of a table to one of the units in the original group would give us a practical general-purpose machine. One feature of this machine would be its rigidity when compared with conventional general-purpose machines. This greater rigidity results from the heavier column that is characteris-

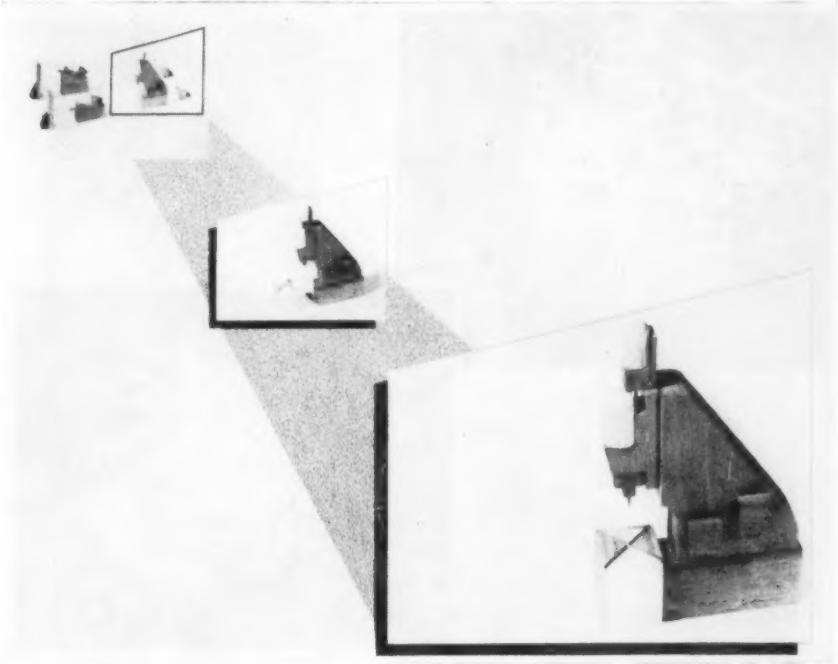


Fig. 8—Interchangeable components concerning the rigid general-purpose machine.

". . . cost of converting three machines was slightly less than $300,000 . . . new facilities would have cost more than $700,000."

tic of "building block" components of in-line transfer machines. In an emergency, this machine could be used for an off-line operation. Its purpose served, the components could again be stockpiled for use on in-line or dial-type machines.

Through the cooperation of machine tool builders, some of the proposals we have discussed are now in use. Fig. 9 illustrates a typical example from one of our engine plants. Due to a recent design change in the crankshaft, it became necessary to change the machine tools shown in the upper left in the illustration. The builder supplied several new wing bases, columns, and other components and units. These machines were then converted, as shown in the lower view, using the bases of the original machines. Because it was possible to utilize the existing main bases, we avoided tearing down the machine foundations, and the basic hydraulic, pneumatic, coolant, and electrical services were undisturbed. The total cost of converting three machines was slightly less than $300,-

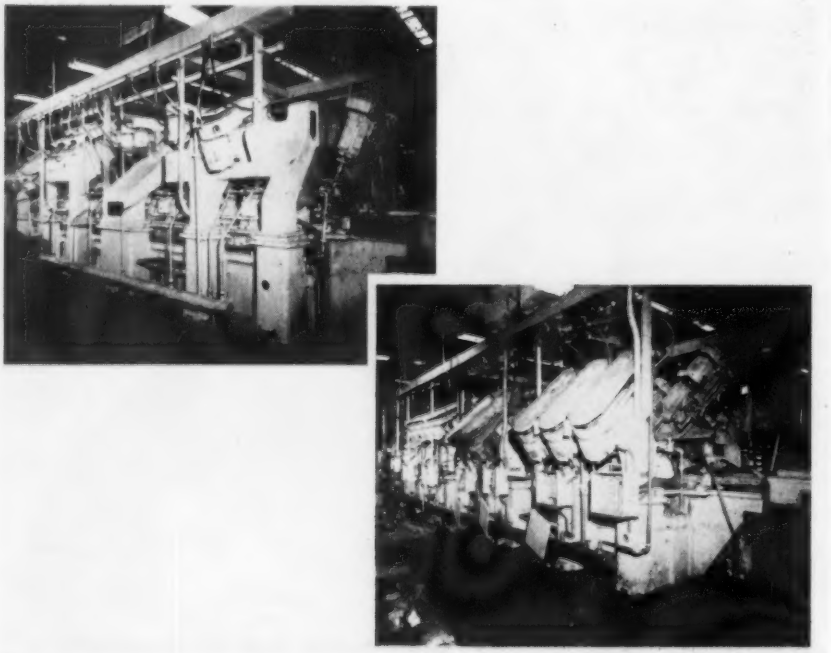


Fig. 9—Illustration showing example of reducing obsolescence by converting machines.

000, whereas procurement and installation of new facilities would have cost more than $700,000.

In addition to making machine tools themselves more flexible, much can be done with hydraulic, pneumatic, and electrical systems to reduce obsolescence and—just as important—greatly minimize production down time for maintenance.

The principle of a unitized hydraulic system is illustrated in Fig. 10. Each section of this typical in-line transfer machine has its own hydraulic unit and, should the hydraulic unit on any section fail, it can be replaced with a spare unit with a minimum of lost time and disturbance to the hydraulic system for the rest of the machine. By the same token, an entire machine section can readily be removed if required due to a change in part design. The close-up view, at the right in Fig. 10, clearly shows a unitized hydraulic system and its compact hookup with its own particular machine section.

As machines and controls become more complex and costly, the necessity for avoiding down time increases greatly. It is also important to minimize both the time and the skill required for on-the-job trouble shooting. One approach to this problem is use of sectionalized and standardized plug-in control components. The principle of sectionali-

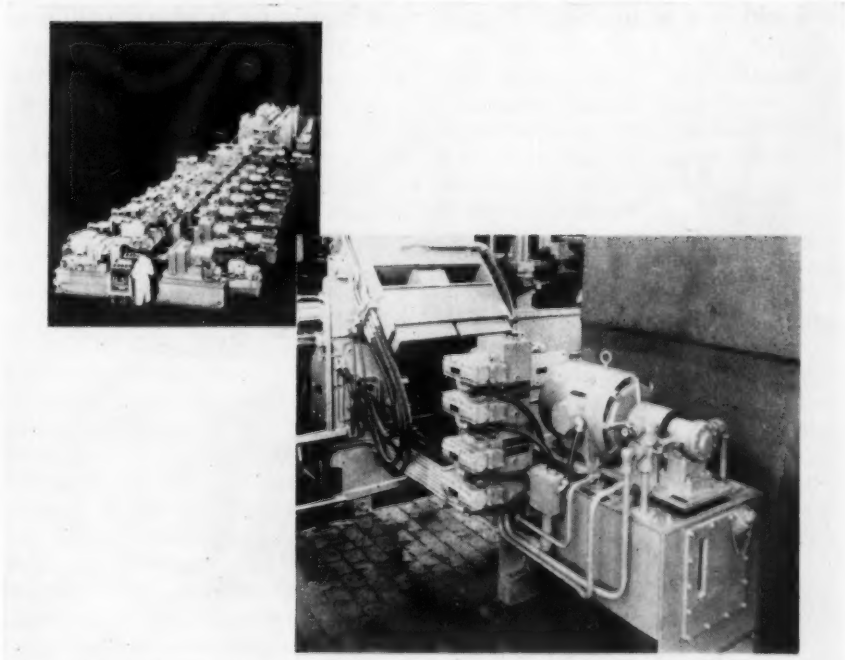


Fig. 10—Illustration showing unitized hydraulic system of in-line transfer machine.

"As machines become more automatic, the importance of minimum down time increases greatly."

zation can be applied to machine tool electrical control panels. Those devices which control approach, feed, rapid return, and stop would be contained in a subpanel, or package unit. Such a subpanel might also contain those relays which control the extra return travel used for tool changes, as well as the signals for interlocking purposes.

In the event of electrical trouble, the subpanel would be quickly removed and replaced by a spare plug-in unit, without making any attempt to locate the specific nature of the trouble. Subpanels so removed would be sent to electrical shop for test, repair if required, and return to stock for use as a spare. A large percentage of existing panels could conceivably be sectionalized into several package units. These units could control various functions such as clamping, indexing, flow of coolant, lubrication, and other related actions.

Adoption of package units in electrical control panels might mean that the size of the panel could be reduced. Since these plug-in units would be removable for repair in the electrical shop, relays could be placed closer together within each unit. Space for trouble shooting in

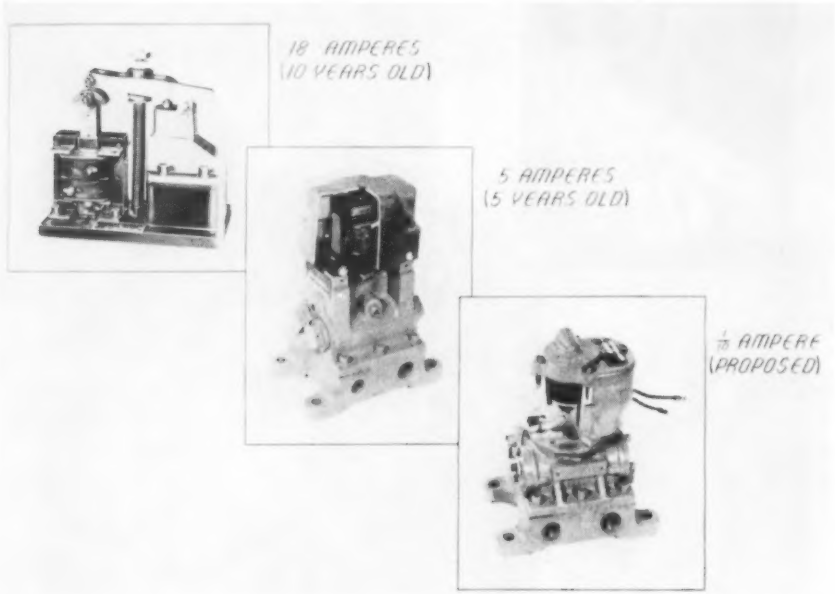


Fig. 11—Illustration showing the evolution of valves for electrical control panels.

the panel or on the job would no longer be required. One way to reduce the size of control panels and package units is to reduce the power requirements of the valves which the relays in these units actuate, as illustrated in Fig. 11. Ten years ago, many valves in common use required inrush currents as high as eighteen amperes. This required a relatively large relay. Valves drawing only five-amperes inrush current are now in frequent use, and some recently designed pilot-operated valves will operate with one-tenth of an ampere of current.

Continued development work on a cooperative basis among electrical, hydraulic, and pneumatic equipment manufacturers will undoubtedly permit further reductions in the size and power requirements of such units. This will in turn permit a reduction in the size of the electrical controls required. As controls are made smaller, removable plug-in subpanels will become even more practical. By eliminating the necessity of repairing or replacing faulty equipment at the panel, these developments would greatly reduce the cost of down time on high production machines.

As machines become more automatic, the importance of minimum down time increases greatly. While plug-in subpanels are still in the proposal stage for machine tools, they are an actuality in control devices for welding operations. Fig. 12 shows a typical plug-in unit being removed from the control panel. As suggested for machine tool controls, this subpanel contains the electronic and electrical components

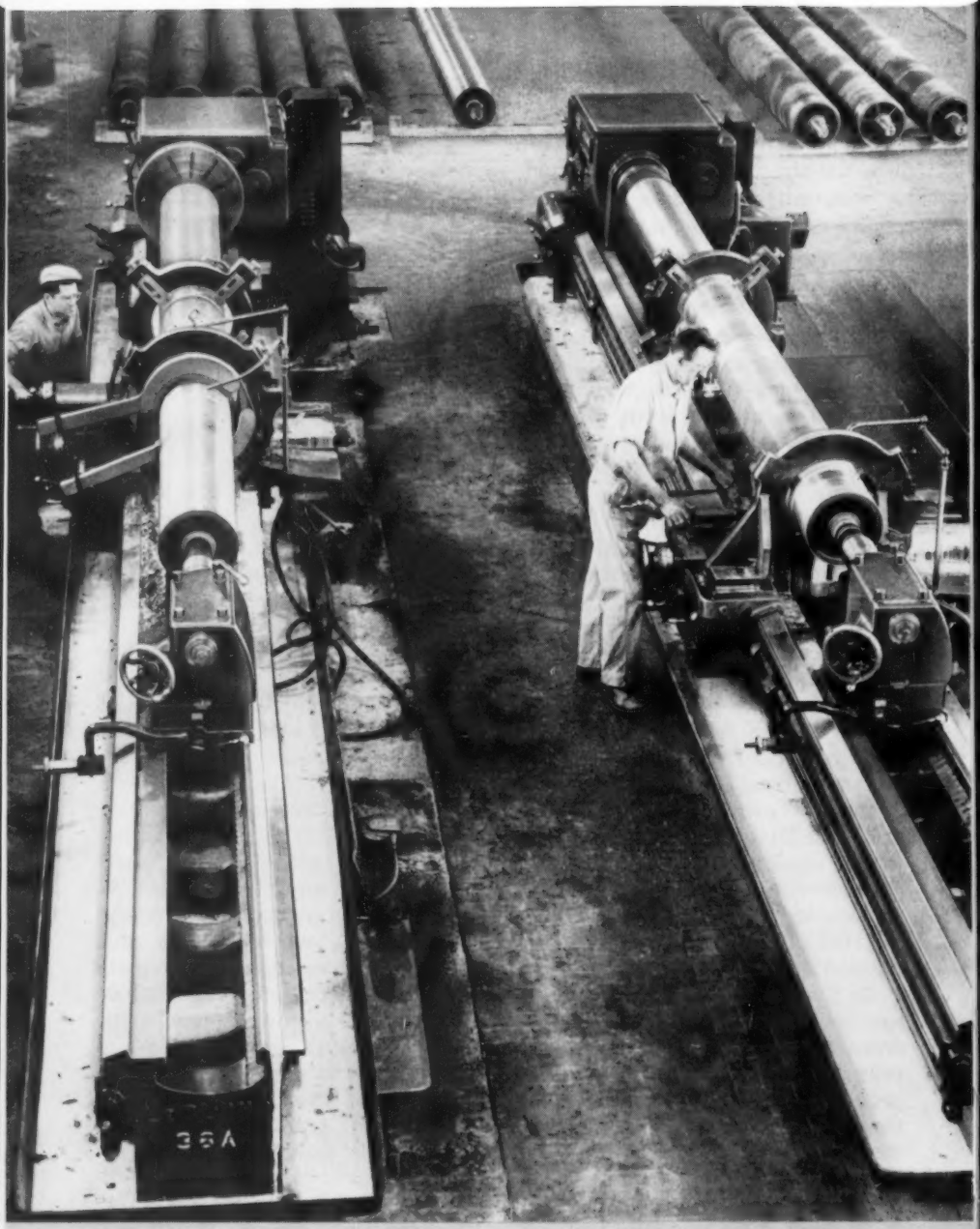
Fig. 12—A plug-in control unit for welding.

which control the basic welding operations. Several thousand units of this type are in operation in the Ford Motor Company.

Actual experience in the shop has demonstrated that a lesser degree of skill is required for maintenance of these welding controls, and that down time has been greatly reduced, since all defective subpanels can be repaired off-the-line in a central repair area. Although several suggestions have been made that could be developed and incorporated in the machine tools and other equipment used in our operations, this would not automatically eliminate costs resulting from obsolescence and production down time. In the final analysis, it is up to industrial management to make the most efficient use of these features in the plants. Here again, good planning is absolutely essential.

The foregoing paper was presented at the 21st Annual Machine Tool Electrification Forum, which was sponsored by the Westinghouse Electric Corporation, Buffalo, N. Y.

Fig. 11—Illustration showing the evolution of valves for electrical control panels.



This illustration shows two of the eight LeBlond 25-inch and 32-inch heavy-duty lathes which are used for "skinning" rolls in Beloit Eastern's new pipe roll shop.

Turning Pipe Rolls

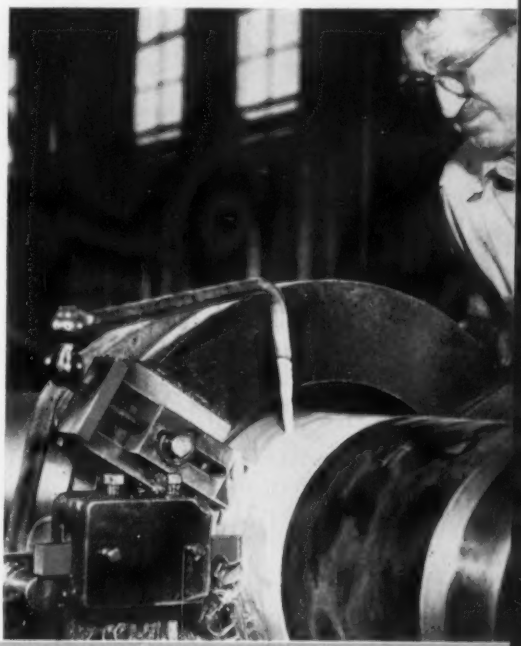
New pipe roll shop uses unique turning method for "skinning" large steel rolls.

An unusual combination turning method is used for "skinning" large steel pipe rolls at Beloit Eastern Corporation of Downingtown, Pennsylvania. Extruded wrought steel pipe rolls are rough turned, finished and polished at one time on LeBlond 25-inch and 32-inch lathes. Accuracy is important since rolls must mate perfectly as they rotate up to 6,000 r.p.m. in high-speed papermaking machinery. Tolerance is 0.002 inch end to end. Rolls range from 8 inches to 24 inches in diameter and are up to 23 feet long.

For roughing, a carbide tool is held in a turret tool block mounted on the compound. A special solid ring-type follow rest bolted to the right carriage wings carries a tool block and high-speed steel finishing tool. For polishing, a wooden emery paper holder, made like a clamp, is supported on the carriage wing against the turning pressure of the pipe roll.

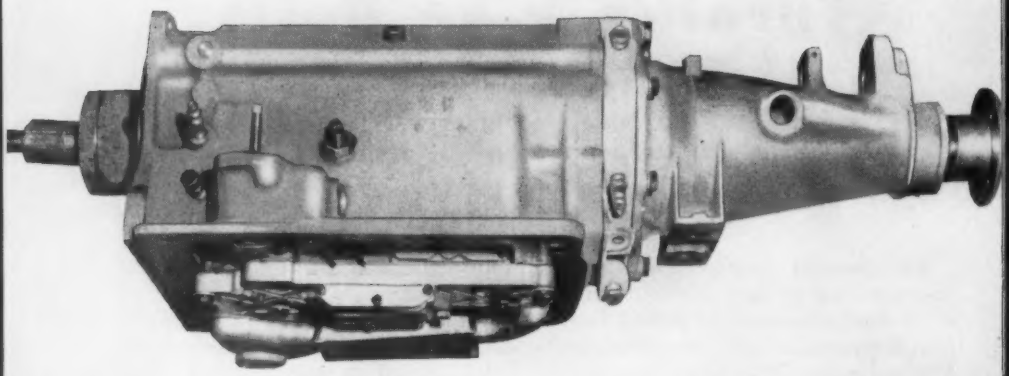
Tailstock rigidity is especially important, since the tailstock spindle must be extended to make room for the follow rest mounted on the carriage wings, when the cut is started. An inbuilt anti-friction spindle is used in the tailstock of the lathe.

Beloit Eastern's new pipe roll shop was planned for minimum materials handling and efficient work flow to a degree that is unusual in custom machinery operation. Raw materials are delivered at one end of the shop and finished pipe rolls come out the other end of the shop.



High-speed steel finishing tool is mounted in block on back of ring-type follow rest.

This illustration shows two of the eight LeBlond 25-inch and 32-inch heavy-duty lathes which are used for "skinning" rolls in Beloit Eastern's new pipe roll shop.



Chrysler TorqueFlite Transmission

Manufacturing the Chrysler

By FRED W. VOGEL
Editor

The output shaft of the Torque-Flite transmission serves the purpose of connecting a reverse planetary annulus gear and rear planet carrier to a universal joint flange. Like many other parts which go into the manufacture of this rugged transmission, the output shaft is a steel forging. Prior to machining, the shafts are shot-blasted and it is in this condition that they arrive at the initial machining setup shown in Fig. 11. This view shows a Davis-Thompson Roto-Matic continuous milling and centering machine which is designed to receive the shafts on an indexing chain conveyor. At full load, the machine accommodates four shafts. First operation is a 60-degree center drilling cut at each end, performed by means of center drills which operate at 1,233 r.p.m. The milling operation which completes the cycle through the machine is performed with the milling cutter operating at the rate of 155 s.f.p.m. The time required for both centering and milling provides a net total production of approximately 200 pieces per hour.

For turning four outside diameter surfaces and facing a small diame-

in block on back of ring-type follow rest.

The concluding half of a story discussing tools, dies, jigs, fixtures and facilities of the Chrysler Kokomo plant for mass producing automatic transmissions.

TorqueFlite Transmission

Exterior view of Chrysler Corporation Kokomo plant

milling and centering machine which is designed to receive the

For turning four outside diameter surfaces and facing a small diame-

"Continuous production is obtained through the use of toolholders with solid carbide inserts."

ter flange simultaneously, the 12 x 33 Fay automatic lathe shown in Fig. 12 is provided. In order to obtain the desired total production of some 240 pieces per hour, three identical Fay lathes are used for this operation. These lathes provide for a spindle speed of 816 r.p.m. and for the use of cutting speeds at 400 f.p.m. Continuous high quality production is obtained in these lathes through the use of Wesson toolholders with solid carbide inserts.

The shafts, moving down the production line for the next machining operation, are next turned in one of three New Britain copying lathes, as shown in Fig. 13. A total of eight separate diameters and one face are machined at this station. The machines provide for a spindle speed of 996 r.p.m., employing a tool feed of 0.020 inch. As shown, a single toolholder equipped with carbide inserts provides the means for rapid metal removal.

Fig. 14 shows a view of the working area of one of two Model

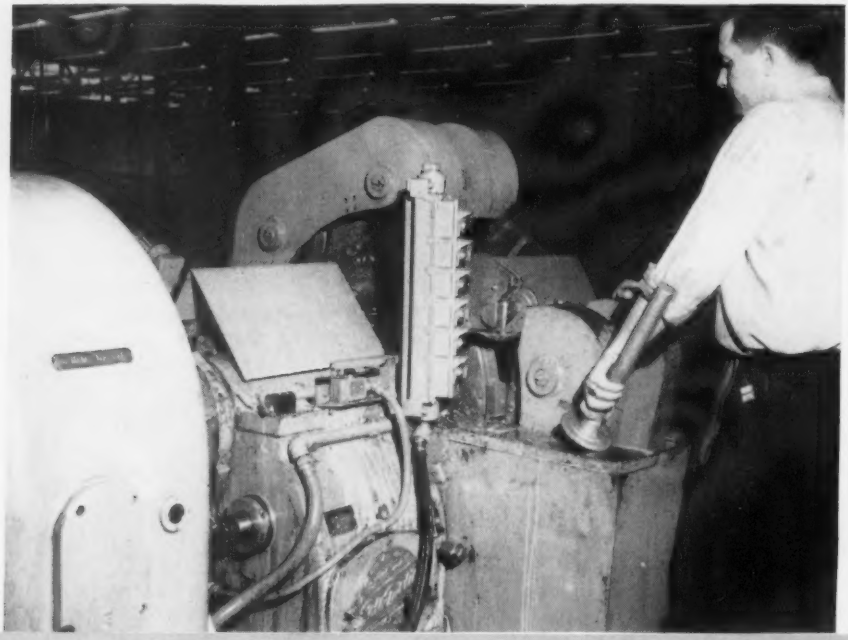


Fig. 11—View of Davis-Thompson Roto-Matic continuous milling and centering machine on which the first machining operations on the output shafts are performed.

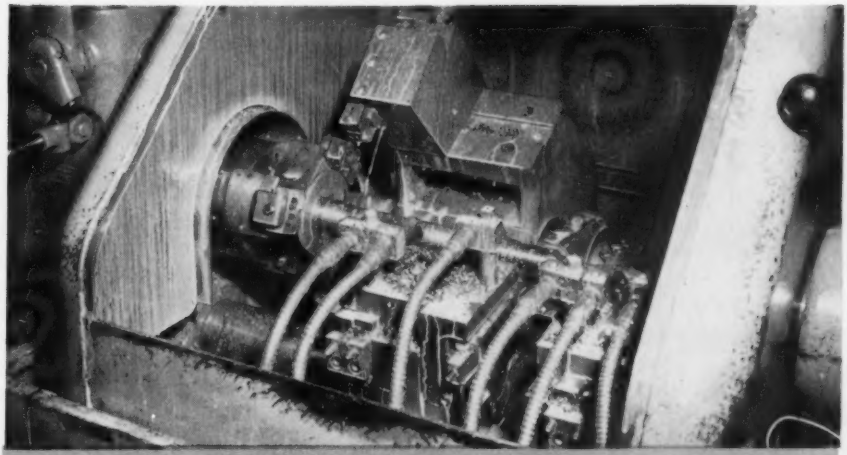


Fig. 12—View inside a 12 x 33 Fay automatic lathe showing tooling setup for turning four outside diameter surfaces and facing small diameter flange on output shaft.

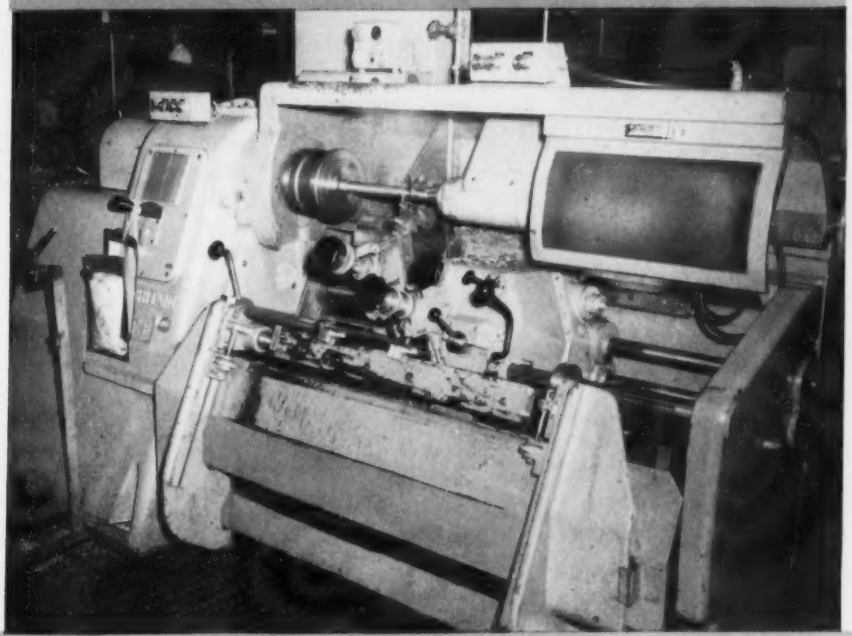


Fig. 13—On this New Britain copying lathe, the machining sequence provides for turning eight separate diameters and a flange face on each transmission output shaft.

Fig. 11—View of Davis-Thompson Roto-Matic continuous milling and centering machine on which the first machining operations on the output shafts are performed.

". . . machine provides for drilling ten holes in the flange section of the shaft and five holes in the stem."

RPA Acme-Gridley 8-spindle hydraulic chucking machines. In this machine it is possible to finish turn the flange o.d., semi finish the flange faces, drill, ream and form a recess, drill two 9/32-inch holes in the flange face, and accurately recenter. Operating at a spindle speed of 292 r.p.m. and a cutting speed of 347 f.p.m., production is approximately 120 pieces per machine per hour.

Drilling operations are performed on the shafts in the Kingsbury 60-inch automatic indexing machine shown in Fig. 15. This machine provides for the drilling of ten holes in the flange section of the shaft and five holes in the stem itself. The production from this machine is approximately 250 pieces per hour.

On the Cleveland hobbing machine shown in Fig. 16, 23-tooth external involute spline is cut near the end of the small end of the shaft. Upon assembly in the completed transmission, this spline meshes with the speedometer pinion.

At the very end of the small end of the shaft, a straight spline is cold formed. This cold forming operation

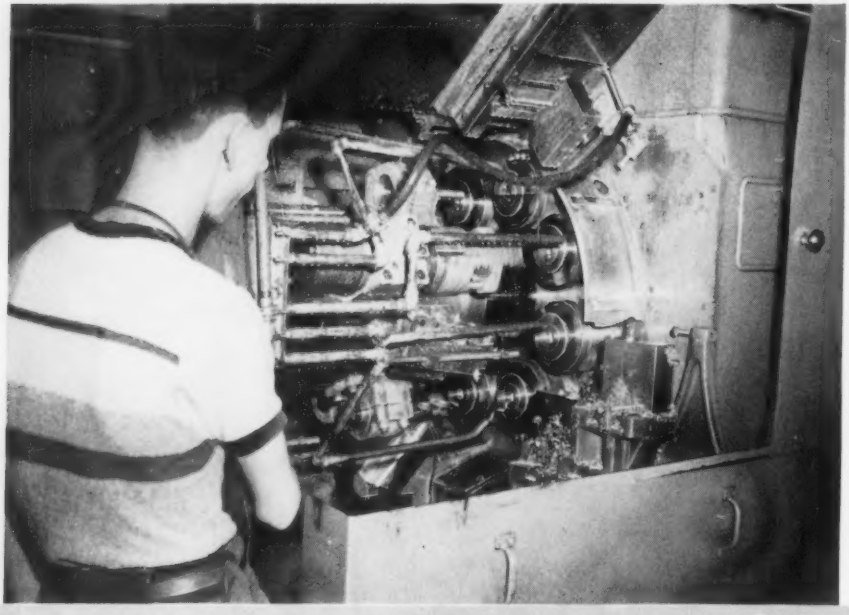


Fig. 14—View of working area of Model RPA Acme-Gridley 8-spindle hydraulic chucking machine on which primary machining operations on output shaft flange are performed.

Fig. 13—On this New Britain copying lathe, the machining sequence provides for turning eight separate diameters and a flange face on each transmission output shaft.

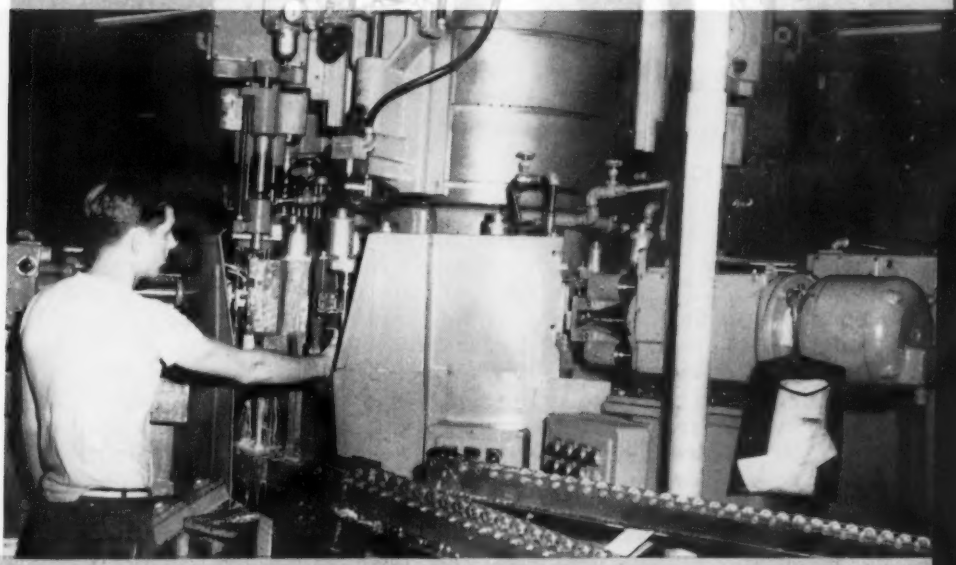


Fig. 15—On the Kingsbury 60-inch automatic indexing machine shown in this illustration, ten holes are drilled in the flange section of the shaft and five holes in the stem.

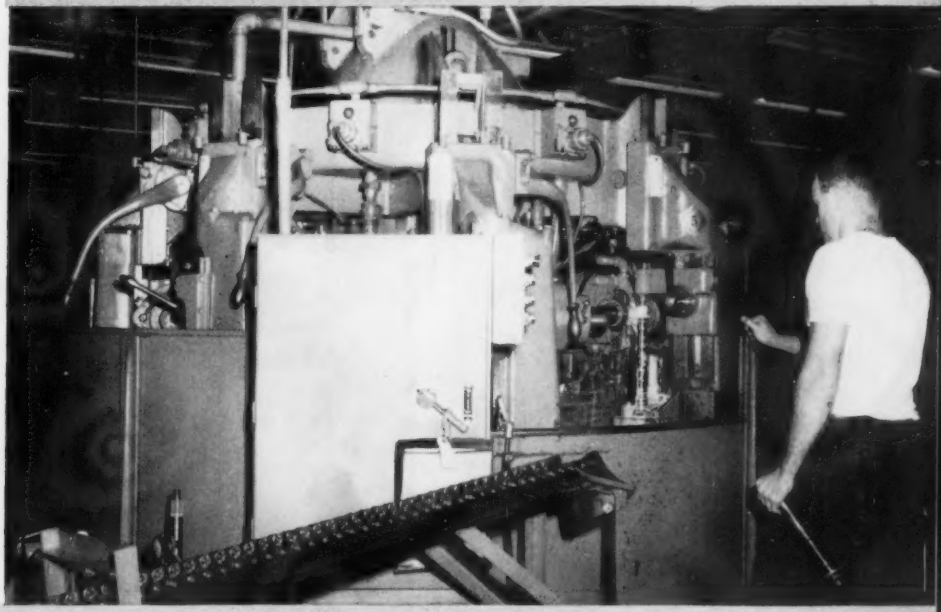


Fig. 16—The Cleveland hobbing machine shown in this illustration provides for the cutting of a 23-tooth involute spline on one end of each transmission output shaft.

Fig. 14—View of working area of Model RPA Acme-Gridley 8-spindle hydraulic chucking machine on which primary machining operations on output shaft flange are performed.

"The time required to perform the chipless machining operation is about ten seconds."

is performed in a Michigan Tool Model 1525 Roto Flo machine, a portion of which is shown in illustration Fig. 17. The time required to perform the chipless machining operation made possible by the Roto Flo is about ten seconds.

In order to check the accuracy of the involute spline and the straight spline, the special holding and gaging device shown in Fig. 18 is used. Periodic inspection of sample workpieces completes the series of operations in the primary machining section. From this section, the shafts go to heat treat, then through a straightening section, and into finish grinding.

In the grinding department, shafts are automatically loaded and unloaded from the grinding machines, as illustrated in Fig. 19. The part shown being processed here is an input shaft, very similar in design and shape to the output shaft. The machine is a Norton Model CV-4 semi-automatic, angular wheel slide grinding machine, designed especially for grinding the inner face of the large flange on the shaft.

Shafts are manually removed from a roller conveyor which passes

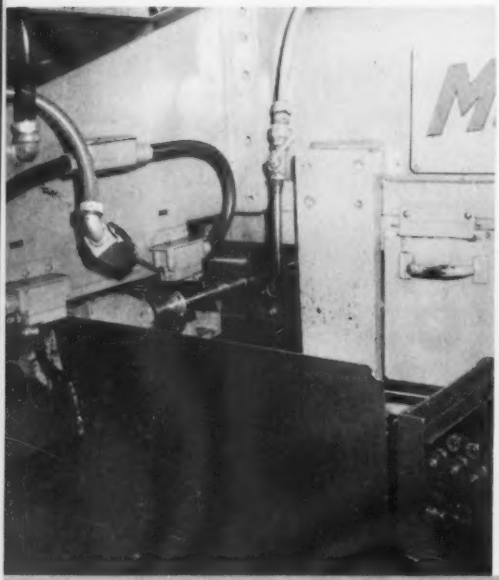


Fig. 17—Spline being cold formed at one end of shaft on Michigan Model 1525 Roto Flo.

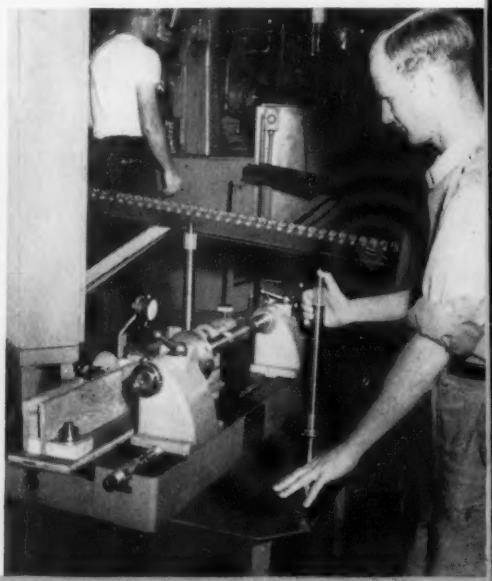


Fig. 18 — Checking involute and straight splines by rotating against master part.

Fig. 16—The Cleveland hobbing machine shown in this illustration provides for the cutting of a 23-tooth involute spline on one end of each transmission output shaft.

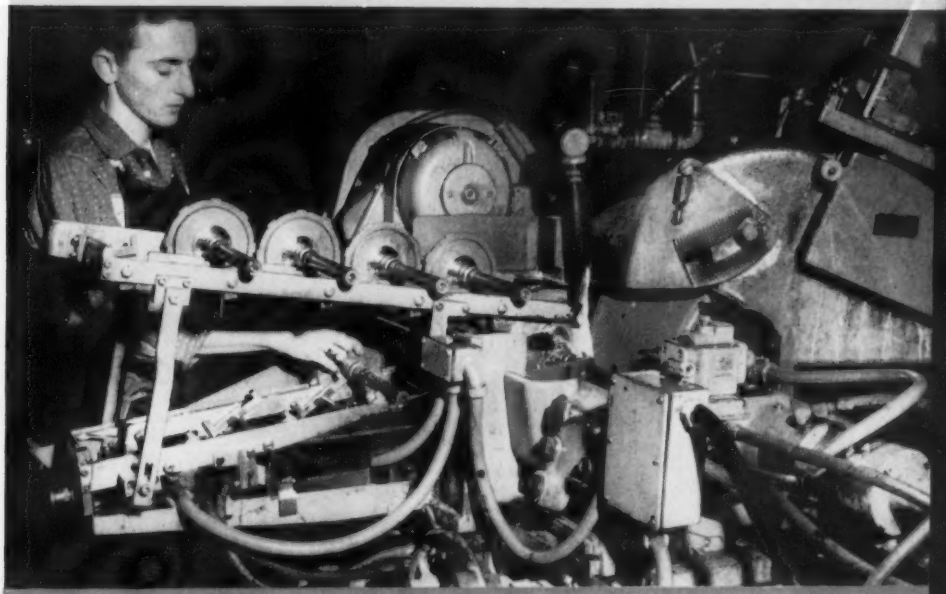


Fig. 19—Norton Model CV-4 semi-automatic, angular wheel slide grinding machine, designed specially for grinding the inner face of the large flange on the output shaft.

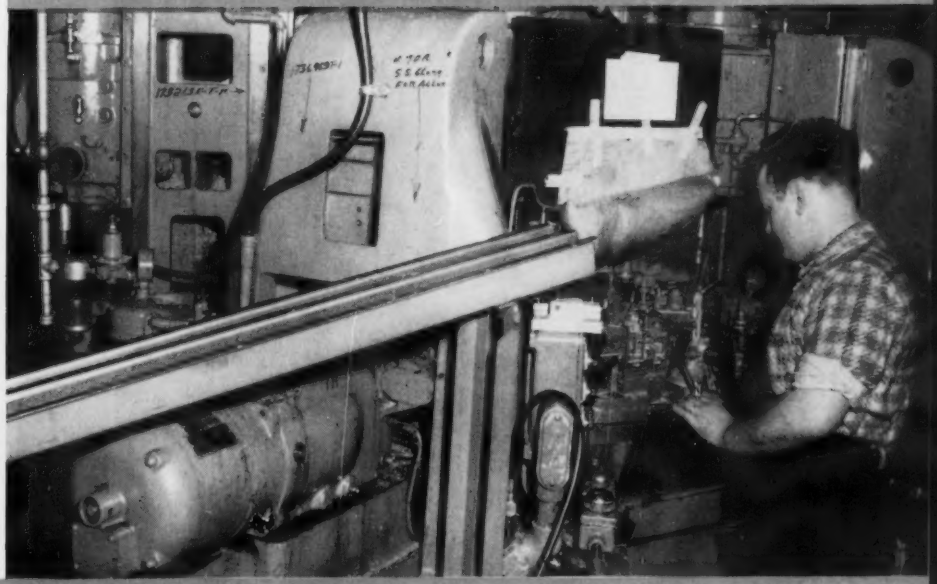


Fig. 20—Kingsbury 12-spindle automatic index type machine on which the front valve body is spotfaced, drilled, tapped, milled and reamed at the rate of 280 pieces per hour.

Fig. 17—Spline being cold formed at one end of shaft on Michigan Model 1525 Roto Flo.

Fig. 18 — Checking involute and straight splines by rotating against master part.

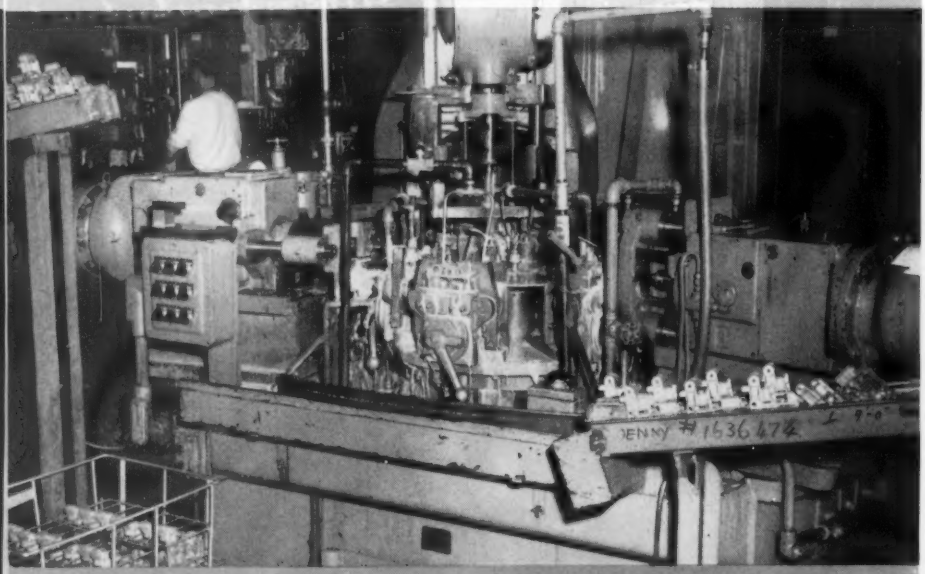


Fig. 21—This illustration shows a view of a Kingsbury 7-spindle automatic index type drilling machine which provides for drilling and a step core drilling operation.

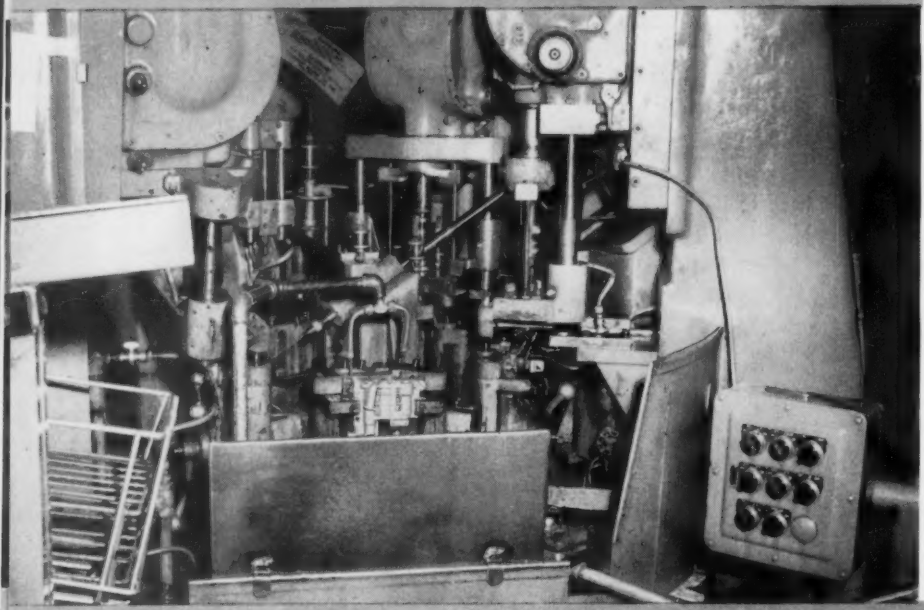


Fig. 22—The 15-spindle automatic indexing machine shown here provides for milling, drilling, semi-finish step reaming, tapping and finish step reaming valve bodies.

Fig. 20—Kingsbury 12-spindle automatic index type machine on which the front valve body is spotfaced, drilled, tapped, milled and reamed at the rate of 280 pieces per hour.

"The front valve body, an intricately shaped die cast aluminum part, is machined in a sequence of operations . . ."

in front of the grinder and placed in the five-position gravity-fed loading rack. As a shaft is fed downward into the machine, it is held on centers and held tight against the rear flange face. The automatic unloading slide also has storage space for five shafts, thus making it convenient for the operator to attend more than one machine. The production of the individual grinders equipped with the automatic loading and unloading slides is about 100 pieces per hour, per machine.

The front valve body, an intricately shaped die cast aluminum part, is machined in a sequence of operations on machines of the Kingsbury manufacture. The first of these machines is the Kingsbury 12-spindle automatic index type machine shown in Fig. 20. On this machine, the valve body is spotfaced, drilled, tapped, milled and reamed. Here the workpieces are machined at the rate of 280 per hour.

Next is the 7-spindle automatic index type machine shown in Fig. 21. This machine provides for drilling, and a step core drilling opera-

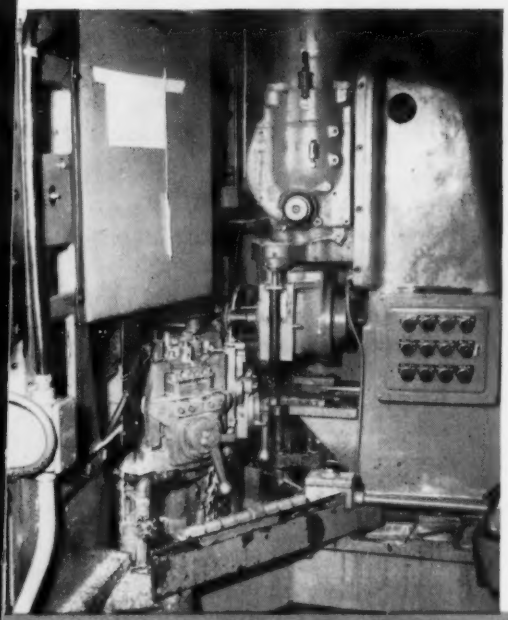


Fig. 23—Close-up view of tooling designed for holding valve body during machining.

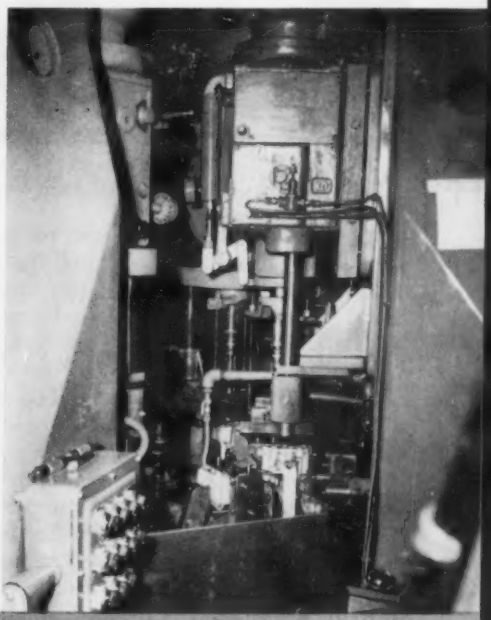


Fig. 24—In this 8-spindle machine, valve body is drilled, semi-finish and finish reamed.

"After each individual machining operation is performed, a continuing spot check of the machined surface is maintained . . ."

Fig. 25 — Checking diameter of blocker valve bore with a Sheffield Precisionaire.

tion. Fig. 22 shows a view of a 15-spindle automatic indexing machine for milling, drilling, semi-finish step reaming, tapping, and finish step reaming.

Two more Kingsbury machines are provided in the front valve body machining line. These machines are shown in Figs. 23 and 24. In Fig. 23, the machine shown is a 5-spindle automatic indexing unit providing for drilling, rough and finish reaming. In Fig. 24, is shown an 8-spindle machine which is designed to drill, semi-finish ream and finish ream.

After each individual machining operation performed on the valve body, a continuing spot check of the machined surfaces is maintained in order to insure maximum acceptable production. Then upon reaching the end of the machining line, the workpieces are checked by means of a Sheffield Precisionaire gage, as shown in Fig. 25. In this illustration, a supervisor is shown holding the valve body with the gage probe inserted in the blocker valve bore as the divisional superintendent observes the reading on the gage scale.

The acceptance of the present TorqueFlite transmission by the

American motoring public has been nothing short of phenomenal — a significant indication that well-planned and executed research and development does pay dividends. Chrysler Corporation, the pioneer in many major automotive developments, such as the TorqueFlite transmission which makes possible further refinement of the convenient "push-button" method of driving, can be depended upon to provide a continuing program of manufacturing know-how befitting its leadership in the automotive field.

★ ★ ★

Machine Tools for Metal Cutting. By W. H. Armstrong. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. 347 pages. Cloth binding, board covers. Illustrated. Price, $5.00.

This one-semester text will provide students in technical institutes and engineering colleges with the necessary technical information about materials, tools, and processes to aid them in machine design, time study, production planning and control and similar areas connected with manufacturing machine shop products.

In a simple, readily understandable manner, the machine tools are listed and described, and the work they are used for is explained. This book deals with materials, tools, and processes employed in the machine shop only. It does not deal with other areas of manufacturing.

In the beginning chapter the author shows the relationship of the machine shop to the metalworking industry; he classifies machine tools and lists the essential parts of a machine tool. Definitions and other materials from *American Standard Preferred Limits and Fits for Cylindrical Parts* are presented and explained. This Standard is new, having been approved in October, 1955.

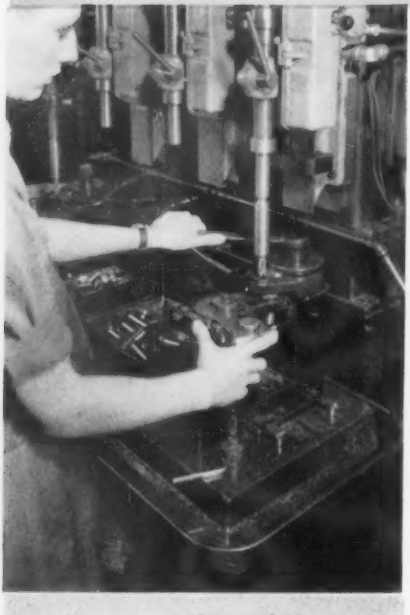
The latest information is given on ceramic cutting-tool materials, a slide rule and a machinability computer that were introduced late in 1955. There are descriptions of general-purpose metalcutting machine tools for turning and boring, drilling, milling, grinding, and planing. Broaching, cutting-off and sawing, electrical-discharge machining, and chem-milling processes and tools are dealt with.

Semi-automatic and automatic machine tools on which turning and boring operations are performed are presented, and automation is discussed briefly. Screw-thread and gear production are described to show the varied approaches that are possible in manufacturing products.

"I'm not sure, but I think it's the latest type automatic screw machine."

TOOL ENGINEERING INCREASES CUTTER LIFE IN Milling Jig

By A. W. WIKE
Factory Manager, Jig Bushing Company, Pontiac, Michigan



Close-up view showing setup used for milling jig bushing slot. Special Go & Go end mill employed has been found to eliminate tool breakage. Machine is a 1½ h. p. Leland-Gifford 4-spindle drill press equipped with variable hydraulic feed.

When our firm switched from using a universal milling machine to a drill press to step up production in milling a slot in a jig bushing, cutting tool breakage increased considerably. No matter what type of standard end mill we tried, the tool would break at around 550 to 600 pieces. It looked like a hopeless situation—until cooperative field engineering by Goddard & Goddard Company, Detroit milling cutter manufacturer, enabled us to obtain 60,000 pieces instead of 600 pieces, using a specially-designed cutter. Moreover, use of the drill press increased production 18 times to 6 pieces per minute per spindle compared with the one-third piece per minute that was formerly obtained.

When a small production shop like ours is required to increase production of a given part, it usually calls for a compromise. We just don't have the wide range of machine tools to select from that the big company enjoys. We have to substitute ingenuity for what we consider the unwarranted expense of a new machine or an automatic setup. Some times this leads to unforeseen difficulties. That was the case here in an apparently simple

Bushing Slots

Cooperative field engineering by milling cutter manufacturer enables jig bushing producer to obtain 100 times more workpieces per cutter.

operation of milling a ⅛-inch deep (plus or minus 0.005 inch) x 11/64-inch radius lock screw slot in a fixed renewable jig bushing. The unforeseen difficulty was the material —ball bearing steel (Timken 52100) with a 207 Brinell hardness. When machine speeds and feeds were increased, tool breakage increased at a rapid rate.

That was our problem when changing from a milling machine to a Leland-Gifford 4-spindle 1½ h.p. drill press for the operation. The machine was reconditioned and equipped with a variable hydraulic spindle feed and simplified two-station manual fixture. In spite of experimenting with various kinds of standard cutters, tool breakage continued at the same high rate. It was then that Go & Go engineers were called in on the job. They studied the operation and designed a special high-speed steel 6-tooth 15-degree right-hand spiral end mill with a 1¼-inch length of cut. Particular emphasis was given to tool heat treatment, which is referred to as "XL" heat treat by Go & Go. Using this tool, some 2,200 to 2,300 pieces are produced per grind and the tool cost per piece has been reduced from 1½ cents to 0.016 cent.

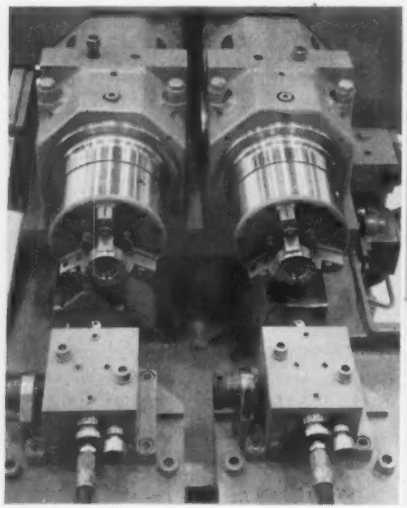
Cutting tool engineering helped solve problem of previous excess tool breakage in milling slot in this jig bushing. Specially-made tool shown is Go & Go high-speed steel 6-tooth 15-degree right-hand spiral end mill with 1¼-inch length of cut.

Boring and Contouring Fuel Nozzle Parts

Setup provides for machining the inside diameters of parts for jet engine fuel nozzles.

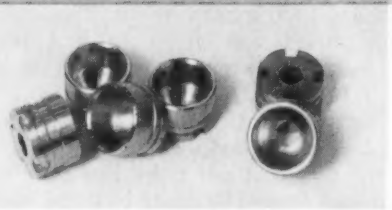
Boring and contouring the inside diameters of parts for jet engine fuel nozzles is accomplished with the setup shown herewith, made on an Ex-Cell-O Style 308 precision cam boring machine. Clamped in three-jaw pneumatically-operated diaphragm chucks, two steel parts are machined simultaneously at a production rate of 148 pieces an hour. The completely automatic work cycle is controlled by two precision cams within the base of the machine. Actuating the table and cross slide of the unit, the cams initiate and regulate all machining operations.

After chamfering the inside diameters, the boring tools enter the workpieces and bore the i.d. to a depth of 7/16 inch. At this point, coordinated movements by the table and cross slide generate a 0.093-inch radius and develop a 37-degree tangent angle. This angle is further blended with a 0.437-inch radius to form the inside contour. The bottoms of the fuel nozzle parts are then straight bored in order to provide a 0.340-inch to 0.343-inch hole.



(Left) Close-up view of the tooling arrangement in the Style 308 precision cam boring machine. One tool in each holder performs a complete operation. Three-jaw pneumatically-operated diaphragm chucks hold the parts during the machine cycle.

(Below) Finished components for jet engine fuel nozzles. The finely finished i.d. was bored and contoured on the precision cam boring machine shown at the left.



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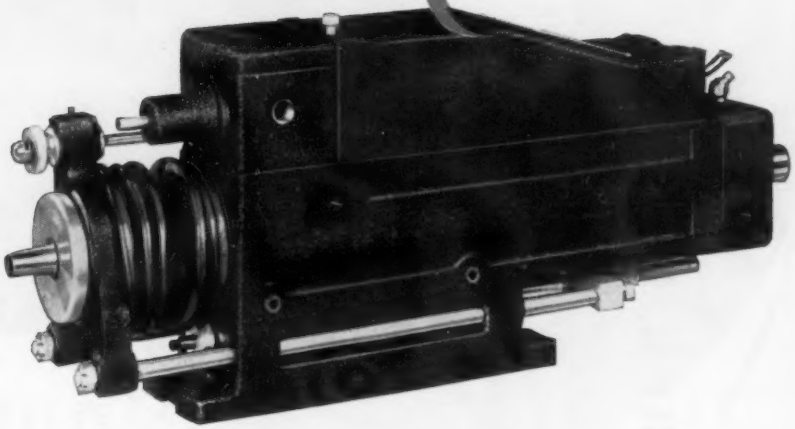

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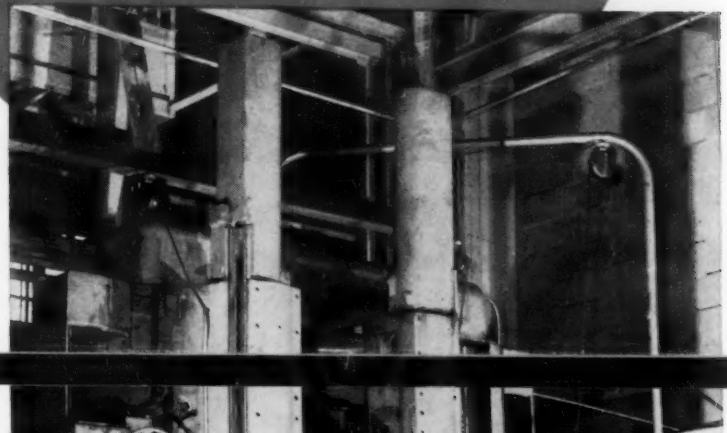

In the machining of a barrel housing used in a large mechanical press, manufactured by the Clearing Machine Co., Chicago, Ill., Mr. L. W. Prochnow, Factory Manager says "our 66" Cut Master, Model 75 is a big, husky machine. Its heavier rams, overall rugged construction and greater horsepower provide higher speeds and feeds easily con-

[illegible]

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tion and greater horsepower provide higher speeds and feeds easily con-

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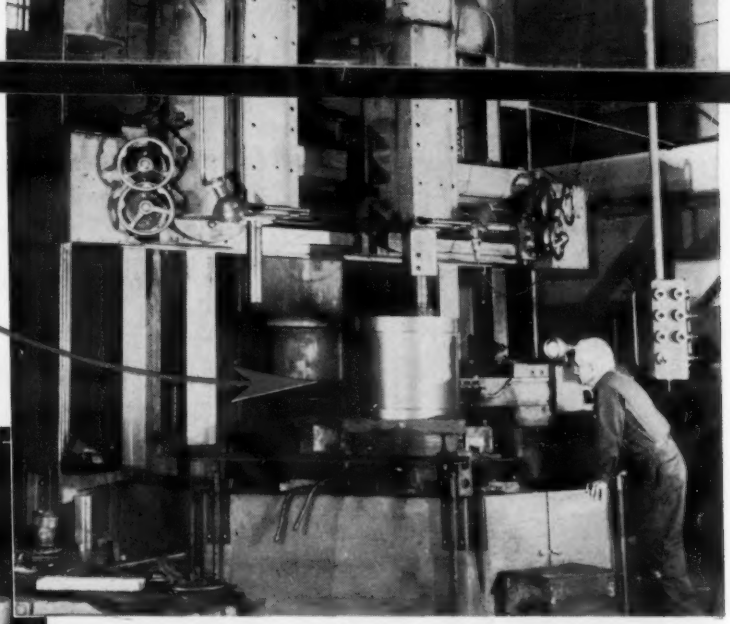

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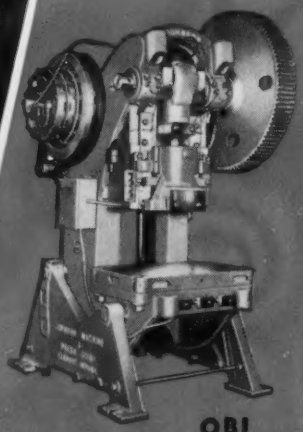

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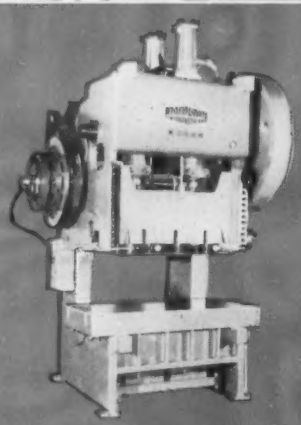

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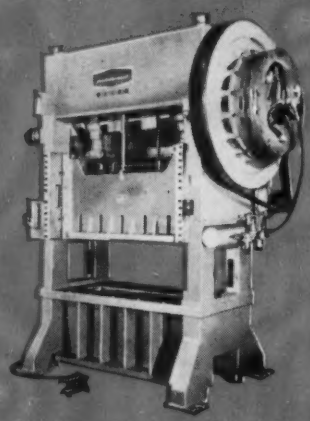

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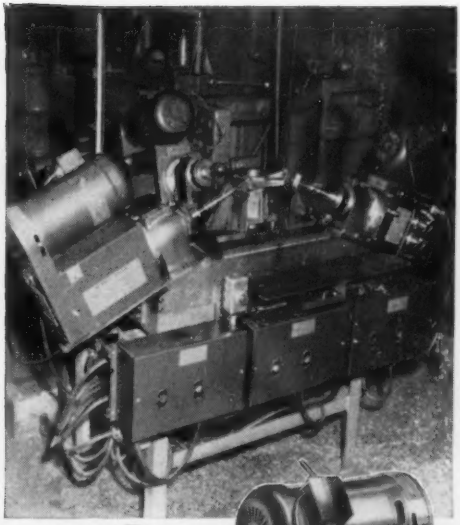

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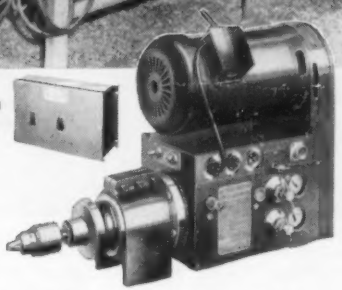

Saves Set-Up, Fixture and Service Costs

A large farm machinery maker, Massey-Harris-Ferguson, uses three new Dumore "Drill-N-Tap" Units to cut costs and increase production on power take-off housings. These units *automatically drill and tap* three holes in two sizes of housings without changing position on the same set-up. Drill bushings are simply removed when tapping. *Tap fits into chuck — no extra tapping head required!*

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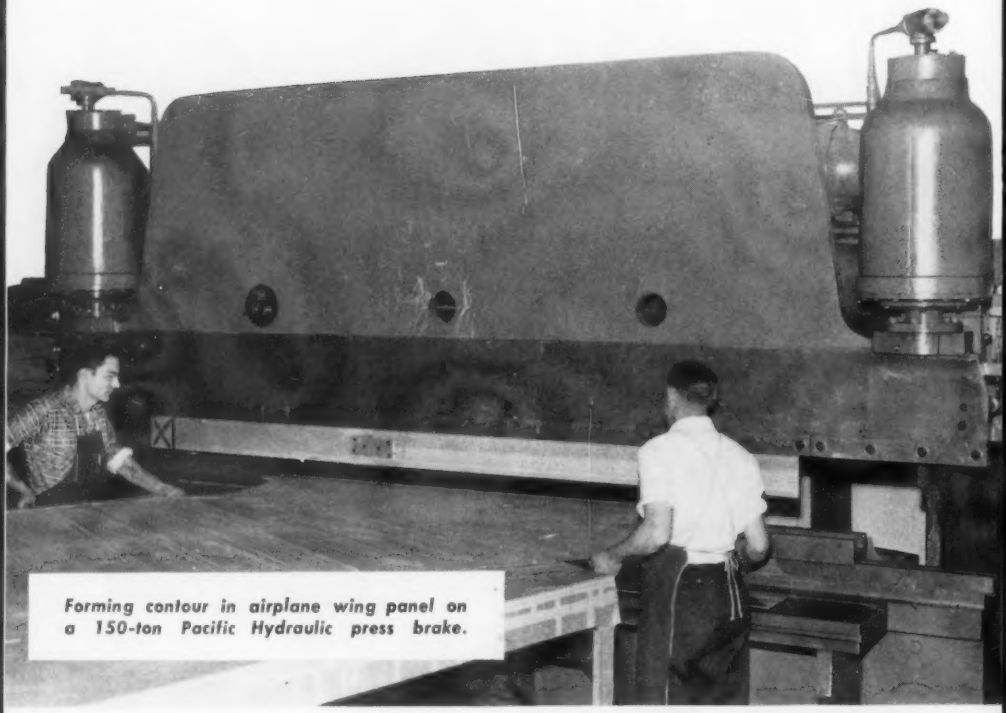
Complex Forming



Forming contour in airplane wing panel on a 150-ton Pacific Hydraulic press brake.

Sculptured airplane wing panels are given curves having continuously variable arcs progressing through several different metal thicknesses.

By GILBERT C. CLOSE
Field Editor

"Using simple and economical shop techniques to accomplish a critical and complex job is an earmark of understanding and experience." This wise old quotation was literally unearthed and brought to life recently at Longren Aircraft Company, Torrance, California. Longren had contracted to form a complex curve along one end of a large, sculptured airplane wing panel after it emerged from a skin mill. The curve had to have a continuously variable arc progressing

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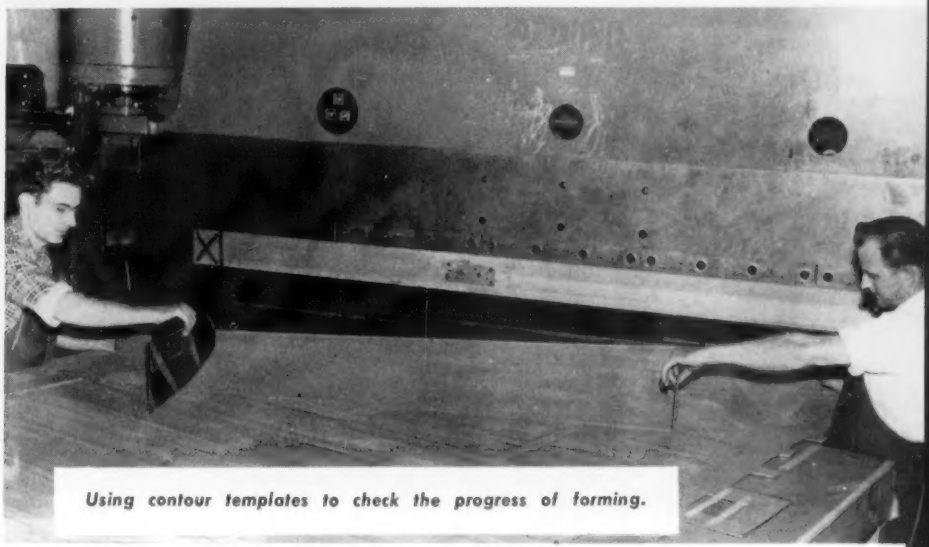
on a Press Brake

through several different metal thicknesses and extending even into the integrally stiffened sculptured wing panels. The finished forming job demanded an external tolerance in keeping with the critical contour tolerances used on a supersonic airplane wing.

"Such a forming job could be accomplished on a heavy press equipped with the appropriate dies," says George G. Gauck, manager of the company's Metal Form Products Division. "But the press would have to be huge, it would require excessive time to design and build the dies, and die costs would be disproportionate for short-run production work."

With the requirements of the forming job firmly in mind, Longren engineers dipped into a reservoir of past metal forming experience for a simplified way of doing it. It was finally decided that a 12-foot Pacific Hydraulic press brake could do the actual bending work. Where and how much to bend with each press stroke was determined by "laying out the work" directly on the part prior to forming.

This work layout consists of 64 lines drawn across the part and converging in a manner so that a small bend along each line will produce the required arc variation throughout its length. In laying out these lines, Longren engineers called upon a vast backlog of metal forming experience in just how the metal would react to press brake pressures, the amount of springback that would occur, and how much permanent set would accrue from the successive hits. The work is backed by a wide female press brake die. Each of the layout lines is centered over this female die and a hit is made.



Using contour templates to check the progress of forming.

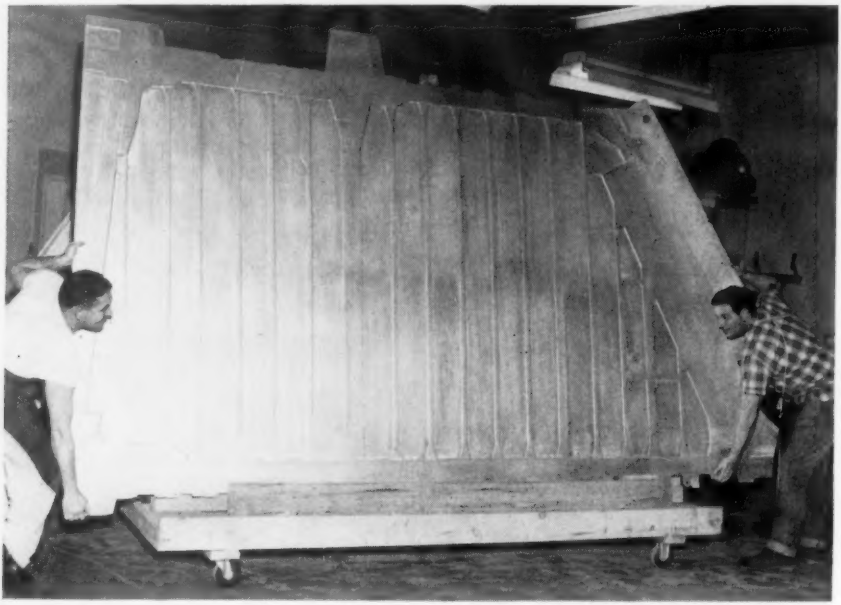
"The pre-calculated amount of each bend is critically controlled by the hydraulic mechanism on the press brake."

Then two more hits are made, one on either side of the line, aggregating a total of 252 hits through the circumferential length of the arc. The pre-calculated amount of each bend is critically controlled by the hydraulic mechanism on the press brake. Shims are used between the brake blade and work to compensate for the different thicknesses of metal encountered due to prior sculpturing.

"Progress of the work is checked regularly with contour templates," Gauck says. "We are very careful not to over-form, as it is much easier to add to than to remove the amount of forming used. A full scale precision check fixture is used for final checking."

The wing panels are thoroughly inspected with a dye penetrant both prior to and after forming. No loss has occurred to date due to a fracture during forming.

No modifications of the press brake were necessary to adapt it for this work. The panels are fed into the brake from a large, flat work table. Due to the flexibility of these large panels, they belly up from the work table only slightly when a section along the arc is depressed into the female press brake die. The



General view of airplane wing panel after forming. Formed section is at far right.

Using contour templates to check the progress of forming.

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Complex Forming on a Press Brake . . .

slow and controlled action of the 150-ton hydraulic brake accomplishes the work with a minimum of surface marking.

"We were fortunate in having press operators, most of them with years of experience in complex metal forming operations, that would tackle a job like this without fear and reservations," Gauck said. "The parts are valued at up to $2,000 each. Less experienced operators might have been too cautious to do a good job."

After installation, this huge wing panel not only serves as a wing surface for a supersonic jet combat airplane, but serves as a part of integral fuel tank as well.

★ ★ ★

Procedure Handbook of Arc Welding Design and Practice. Eleventh Edition. Available from The Lincoln Electric Co., Cleveland 17, Ohio. 1,300 pages. Simulated leather cover. Price, $3.00.

The book is arranged and written as a reference book covering all phases of arc welding. Its contents range from the early history of arc welding to the intricacies of structural design. The eight sections are divided by subject matter for easy study. Each section has its own table of contents, and there is a complete alphabetical index for the entire book. The eight sections are: history, nomenclature and processes, weldability, mild steel procedures, manufacturing cost data, machine design, structural design, applications and reference data.

The 465 page structural section has been completely rewritten and includes the latest data on welded design, as found in recently built structures and current research. There is a discussion of the theory and application of the rigid frame and plastic design systems. Details on the design of structural members and joints are included.

The machine design section presents an entire machine design system which directs the designer from his starting point of "what the machine must do" to a fully completed design.

The weldability section presents information on how to weld all of the commonly welded metals, including such new materials as zirconium and titanium. The mild steel welding procedure section gives detailed procedures for all joints.

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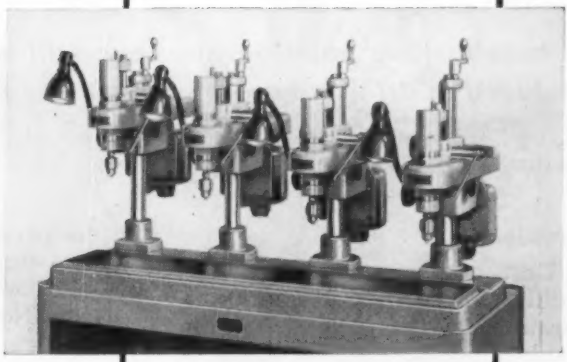

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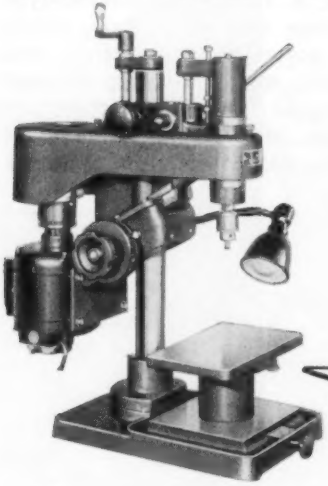

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Machining Stainless Steel

A case history pointing out how drill wear was greatly reduced in drilling hardened stainless steel shafts.

By G. J. STEVENS
Machining Engineer, Armco Steel Corporation

Problem:

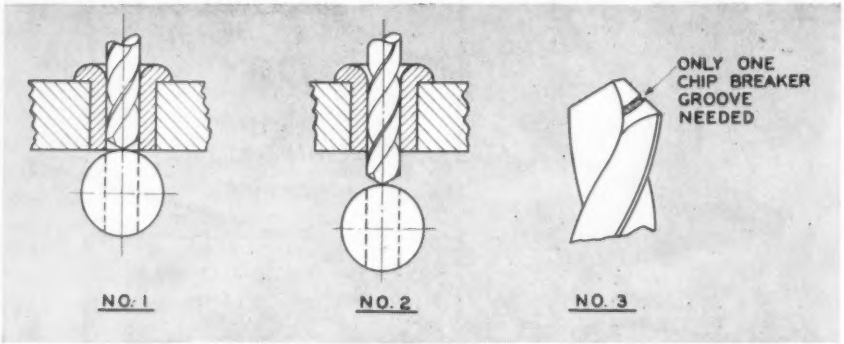
Drills were wearing rapidly while drilling a large batch of 5/8-inch diameter 17-4 PH (precipitation-hardening) stainless steel shafts. A 1/4-inch diameter drill was being used in a drill press operated at 30 f.p.m. The material was approximately Rockwell C 30 in hardness and about 3 to 5 holes per drill was the average yield.

The drill jig bushing was located directly on the shaft for close hole alignment. (See sketch No. 1 of the accompanying drawing.) This resulted in poor chip elimination, which, in turn, caused the drill to re-cut its own chips and to wear rapidly. A conventional drill bushing design could not be used because of close tolerance alignment of the drilled hole.

Sketch No. 2 shows an arrangement which provides one drill diameter chip clearance between bushing and workpiece.

Solution:

The drill was ground with a chip-breaker groove on the one lip, as shown in sketch No. 3. This grind yielded a continuous double-type chip from each drill flute, which curled out of the drill bushing and effectively solved the chip disposal problem. As a result, the production rate was increased to an average of some 200 holes per drill grind.



Grinding of a single chip-breaker groove on one lip of the drill has been found to greatly increase tool life in the drilling of hardened stainless steel shafts.

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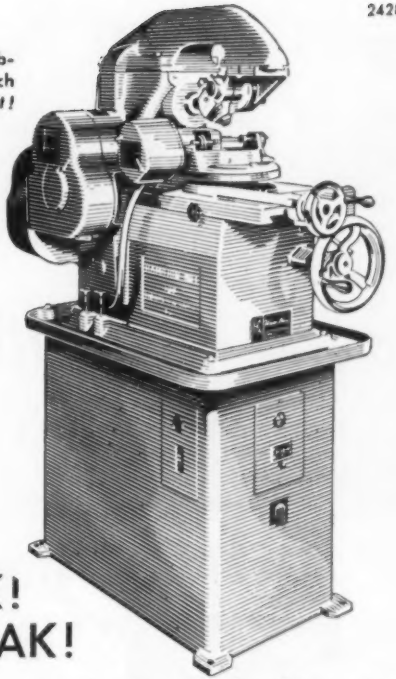

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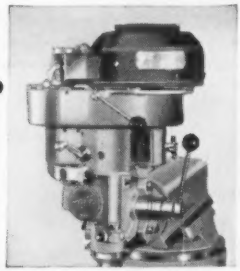

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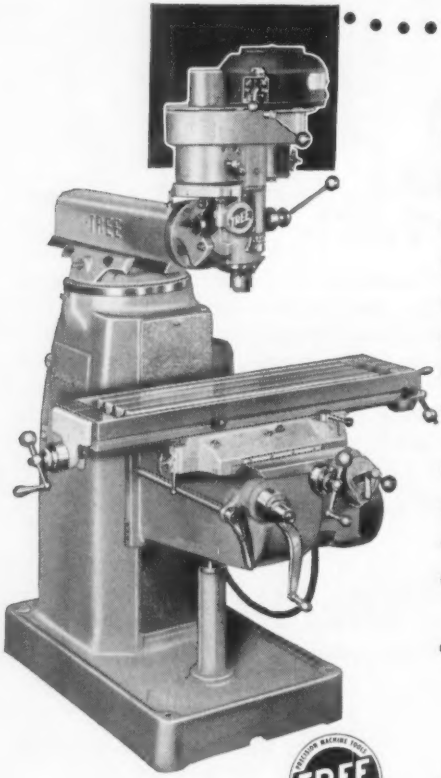

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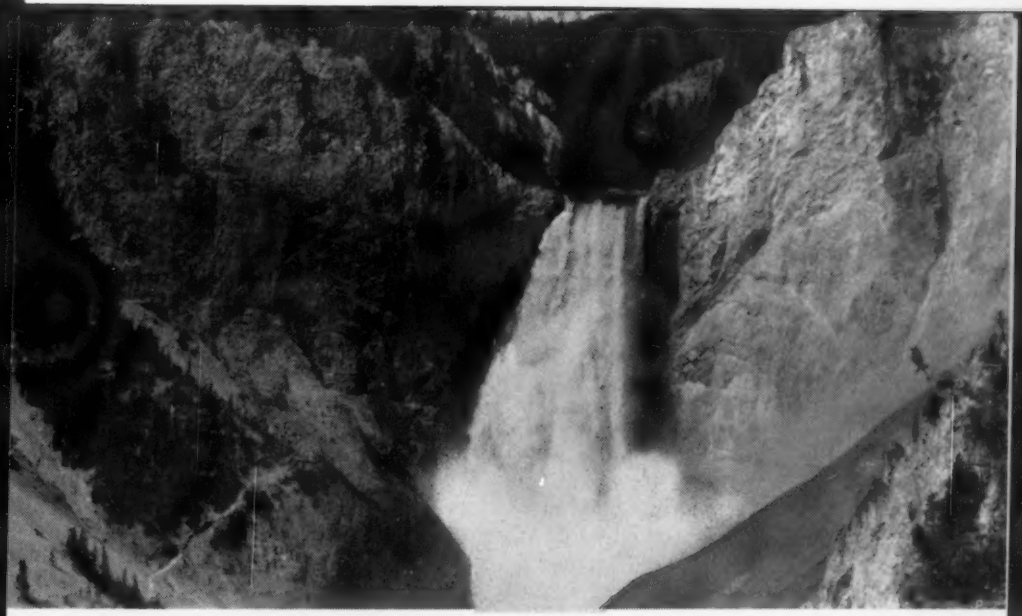

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Submerged arc welding process is used to economically restore worn paper mill and blooming mill rolls to useful life.

Using a Unionmelt DS head, installed on each of two lathes, the Great Lakes Welding Company of Detroit, Michigan, quickly hard-surfaces such worn cylindrical parts as paper mill rolls and blooming mill table rolls — parts that would have to be scrapped unless rebuilt by hard-surfacing. One lathe handles parts up to 54 inches in diameter and 18 feet long, while the other lathe accommodates pieces up to 30 inches in diameter and 12 feet long. The lathes are adjustable, permitting surfacing of different diameters on a single part.

Supported on the lathe tool carriage, the Unionmelt head moves automatically at a set rate, while the worn part is rotated by chucks which are driven by the headstock. The rotating workpiece is grounded by means of a sliding contact which bears against the outside of the lathe chuck. The flux hopper, containing Unionmelt No. 80 flux, and the wire reel are positioned above the head.

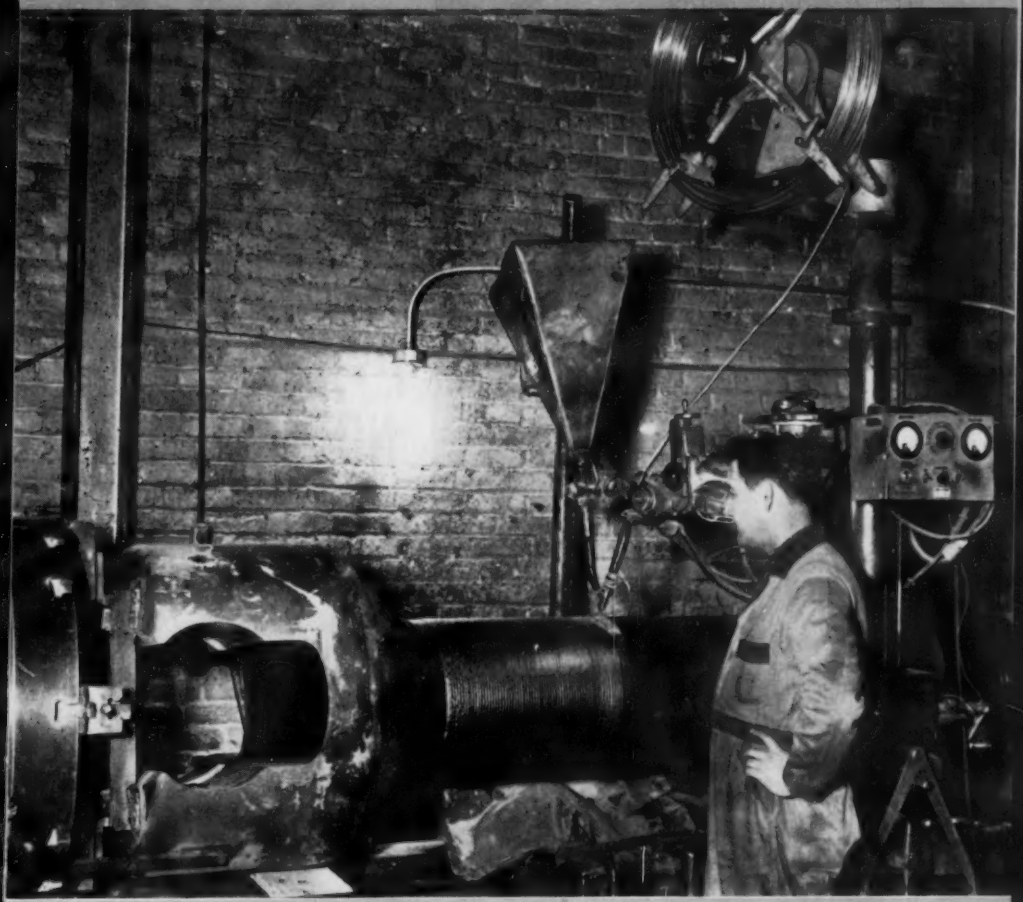
Since the controlled operation of the Unionmelt head is fully mechanized, parts are surfaced with a minimum of operator time. Once welding starts, the machine continues automatically, requiring only occasional attention. Welding speeds vary from 30 to 60 inches per minute, depending upon the thickness of the deposit.

As the metal is deposited, each weld bead unites with the bead next to it as well as with the metal below. If required, several layers of metal are deposited until the original diameter of the part is restored. By using the proper wire, a surface is produced that is actually harder than the original part. After the metal is deposited, the new surface is machined or ground to provide any desired degree of roll finish.

This illustration shows two paper mill rolls after hard-surfacing at the Great Lakes Welding Company, Detroit, Michigan.

Cutting Fluids
PRODUCTION PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

Worn Mill Rolls



This view shows the first of three passes required in order to restore a 20-inch diameter on a spindle for a blooming mill drive.

The Unionmelt Head, the flux hopper, the wire reel, and the welding controls are moved by means of the lathe tool carriage.

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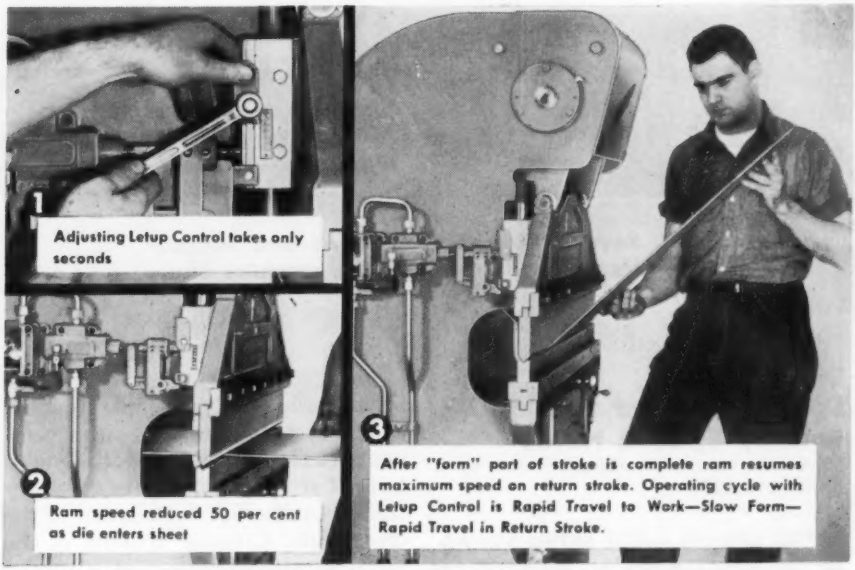
1
Adjusting Letup Control takes only seconds
2
Ram speed reduced 50 per cent as die enters sheet
3
After "form" part of stroke is complete ram resumes maximum speed on return stroke. Operating cycle with Letup Control is Rapid Travel to Work—Slow Form—Rapid Travel in Return Stroke.

Letup Control on New High Speed

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Page 150

ideas from readers

ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

Lathe Setup for Drilling Equally-Spaced Holes

By H. J. GERBER

The simple lathe setup shown in the accompanying illustration is designed to provide a quick and efficient method for drilling equally-spaced holes in work mounted in a lathe chuck. The portable drill used is supported by a simple bracket which is bolted to the lathe compound. The distance of the holes from the centerline is easily controlled by the feed movement of the cross slide. Circular spacing of the holes is controlled by a stop bar located between the lathe bed and each of the jaws of the chuck.

The illustration shows three equally-spaced holes being drilled in a lathe faceplate while set up in a three-jaw chuck. For drilling either two or four equally-spaced holes, a four-jaw chuck would be used in a similar manner.

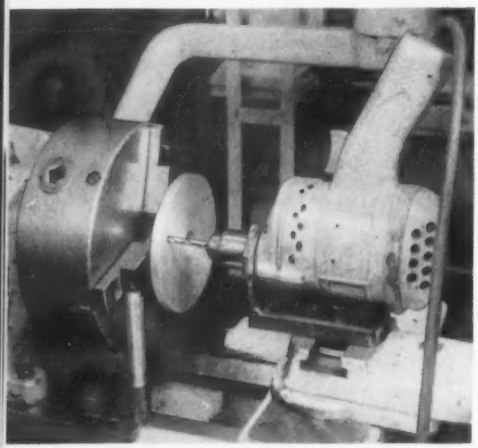


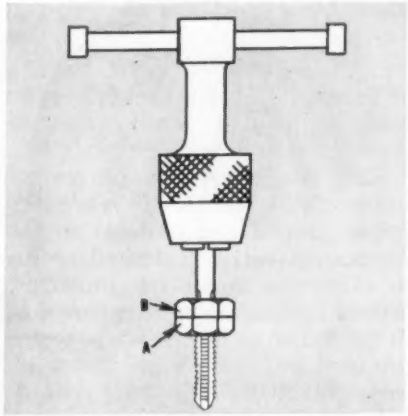
Illustration showing simple lathe setup for quickly and accurately drilling equally-spaced holes in work mounted in lathe chuck.

★ ★ ★

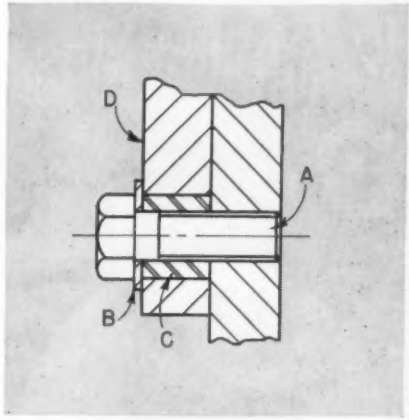
Preventing Tap Breakage in Tapping Blind Holes

By BUCKLEY SULLIVAN

A simple way to prevent binding a tap in the bottom of a blind hole and usually breaking the tap is to fit the tap with two nuts before starting the job, as shown in the accompanying sketch. The lower nut *A* is thread on the tap in such a



Sketch showing tap equipped with two nuts to prevent binding of the tap in the threading of blind holes with a hand tapper.



Cross-sectional drawing of a swinging leaf construction for tools, jigs, fixtures, and so on, which utilizes standard parts.

position as to serve as a depth stop while the other nut *B* is used to lock the lower nut in place.

★ ★ ★

Swing Leaf Construction Utilizes Standard Parts

By ROGER ISETTS

When designing a tool or fixture which requires a swinging leaf or other type of rotating member, it is always a good idea to use standard parts wherever possible. Instead of making special shoulder screws or other expensive hand made parts in the construction, a design such as shown in the accompanying sketch can be easily and economically made. Rigid in construction, this construction can be adapted to suit many different conditions arising in the designing of jigs, fixtures and various types of special machines.

Referring to the sketch, the construction consists essentially of three parts, all of which are standard items; namely, a standard hexagon head cap screw *A*, a plain washer *B*, and a standard headless drill bushing or liner *C*. The thickness of the swinging member *D* is made slightly less by a few thousandths of an inch than the length of the bushing to permit free movement.

★ ★ ★

Height Setting Bench Block

By T. BIZZOCO AND O. CORDERO

Oftentimes inspectors, toolmakers, and machinists are faced with the problem of making a multiple dimension check of workpieces. If accurately made, the device shown

2 Applications

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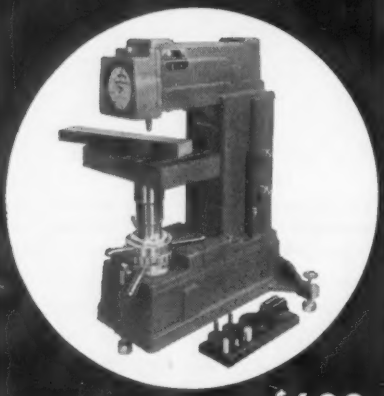
1 Tester



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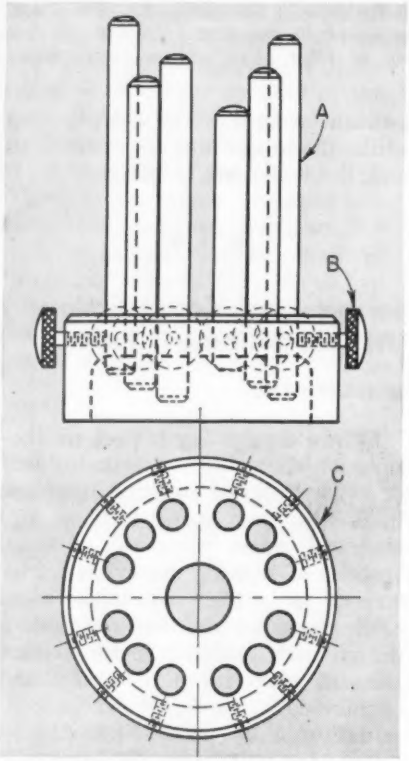
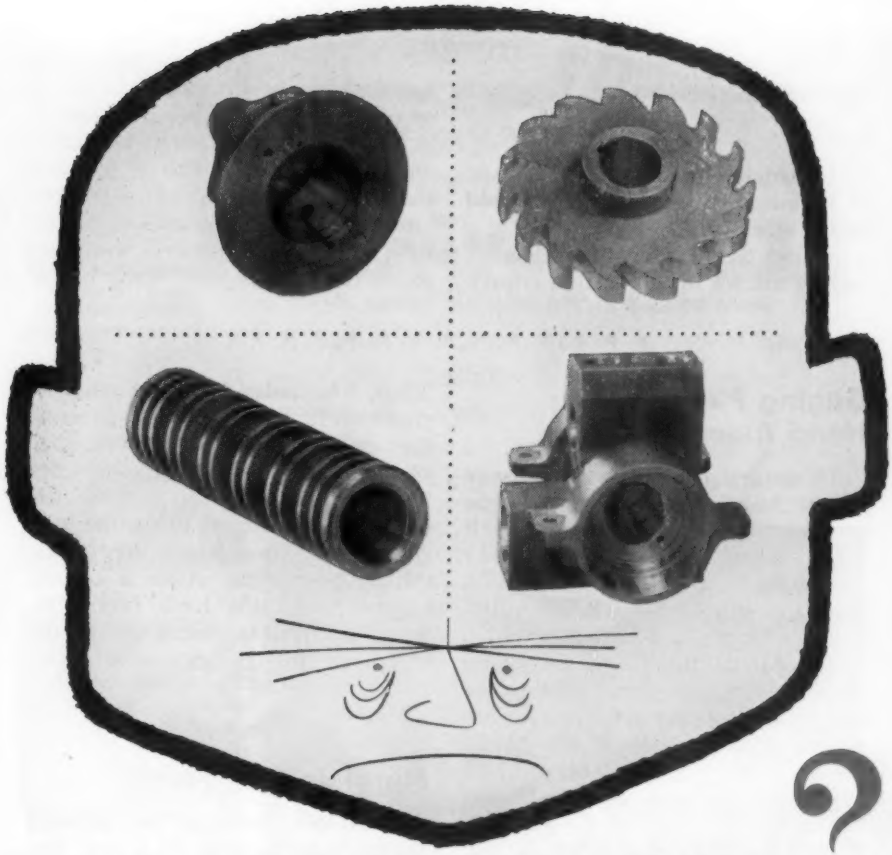
in the accompanying sketch may be used to facilitate such types of checking operations.

The device consists of several pieces of drill rod, *A*, which are centerless ground and rounded on the measuring end to a desired radius to eliminate squareness problems; several holding or setting screws, *B*, of the thumb or headless type which are used to maintain the preset adjustment of the measuring rods *A*;



Sketch of height setting bench block.



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and a block, *C*, which may be made of cast iron or case hardened cold rolled steel.

To use the device, the measuring rods *A* are set to the desired adjustment with a height gage, size block or other means and are maintained at the proper adjustment by tightening the screws *B*. The device may then be readily moved anywhere on a bench plate by means of the base *C* and the desired measurements of the workpiece easily taken.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Gaging Planer Cutter Head Assemblies

To assure that holes in planer cutter head assemblies provide precision fits for set screws, Skil Corporation, Chicago, constantly checks for size accuracy with Besly-Metro double end reversible cylindrical plug gages. The two opposed blades fitted into the planer cutter head each have three holding set screws and another set screw for adjusting the position of the blade. Thus, four holes per head must be checked. In the production process, the drilling set-up operators gage the hole sizes periodically in order to determine wear, if any, on the drills, alignment or any other machining variation which may occur during processing. After a certain number of heads have been run, the department inspector verifies the setup by also checking with gages.

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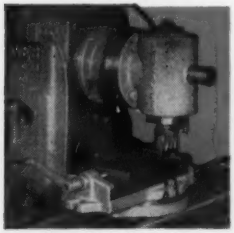
Set screw holes in planer cutter head assemblies are checked by operator using a double end reversible cylindrical plug gage.

★ ★ ★

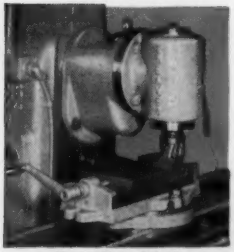
Metal Joining Movie

"Modern Methods for Joining Metals" is the title of a new motion picture announced by Linde Air Products Company which shows a variety of welding processes and applications. Filmed at leading metal fabricating companies and Linde's laboratories, this 20-minute sound and color motion picture illustrates the importance of the welding engineer in industry. It also shows the many factors involved in electric welding.

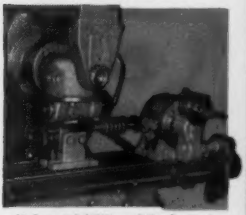
Arrangements to see this film can be made by contacting the nearest Linde office or by writing to Linde Air Products Co., a Division of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.



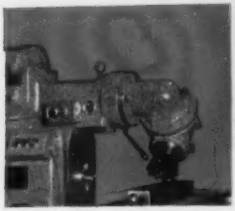
Heavy Duty Vertical Milling Attachment



Heavy Duty Offset Vertical Milling Attachment



Universal Milling Attachment



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new literature

Use the Reader Service Cards opposite pages 32 and 340 for requesting free copies of the literature listed below.

1. Carbide Tools
Adamas Carbide Corp., Kenilworth, N. J. Tungsten carbide tools, tool tips, wear parts, Dex-A-Tool and Ceralox.

2. Carbides
Allegheny Ludlum Steel Corp., Henry W. Oliver Bldg., Pittsburgh, Pa. Information on Carmet carbide grades.

3. Production Press
Alpha Press and Machine, Inc., 9281 Freeland Ave., Detroit 28, Mich. Two point back gear under drive production presses.

4. Metalworking Solution
F. E. Anderson Oil Co., Inc., Box 216, Portland, Conn. Lusol — an oil-free metalworking solution which is a combination coolant, cleanser, rust-preventive and water conditioner.

5. End Mill
Arrow Tool and Reamer Co., 711 Stephenson Highway, P. O. Box 338, Troy, Mich. Information concerning 3 flute end mills.

6. Production Dies
Atlantic Tool and Die Co., 1374 Highland Ave., Lakewood 7, Ohio. High production dies, fixtures, special machines and projection form grinding.

7. Pipe Tubing
The Babcock and Wilcox Co., Tubular Products Division, Beaver Falls, Pa. Titanium metal pipe tubing—Grades A-40, A-55 and A-70 for pressure and mechanical uses.

8. Honing Tool
Barnes Drill Co., 860 Chestnut St., Rockford, Ill. Special Blind-End Honing Tool with adjusting head utilizing Plas-T-Clad stones.

9. Drills
Beloit Tool Corp., Regal Division, P. O. Box 30, Beloit, Wis. Data relative to Regal High-Speed Straight Shank Drills.

10. Form Roller
Bender Tool and Engineering Co., 42025 Van Dyke, Utica, Mich., Six spindle form roller has 3 h.p. motor and reductor.

11. Taps
The Besly-Welles Corp., 108 Dearborn Ave., South Beloit, Ill. Tap size selection table, special taps and tap-drill and thread engagement selection tables for all common materials.

12. Screw Machine Tools
Brown and Sharpe Mfg. Co., Providence 1, R. I. Information concerning screw machine tools for automatic and hand screw machines.

13. Oxide Cutting Tools
The Carborundum Co., Stupakoff Division, Latrobe, Pa., Stupalox High Strength Oxide Base Cutting Tools.

14. End Mill
Chicago-Latrobe, 419 West Ontario St., Chicago 10, Ill. High-speed end mills for tape-controlled and tracer milling operations.

15. Oil Seal
Chicago Rawhide Mfg. Co., 233 Elston Ave., Chicago 22, Ill. C/R Oil Seals, Sirvis Leather, Sirvis-Conpor leather which permits self-lubrication without objectionable leakage, and a wide range of Sirvene compounds.

16. Oil Base Additives
Cincinnati Milling Machine Co., Cincinnati Milling Products Division, Cincinnati 9, Ohio. Chemically Formulated Cimcut Concentrates include Cimcut AA (general purpose), Cimcut NC (non-corrosive) and Cimcut SS (heavy-duty).

17. Surface Plate Calibration
Collins Microflat Co., 3249 West El Segundo Blvd., Hawthorne, Calif. "How to Calibrate Surface Plates in the Plant."

18. Contour Mill
Colonial Broach and Machine Co., Colonial-Romulus Division, Parkgrove Station, Detroit, Mich. The Hydro-Cycle Contour Mill, which is a hand-guided tracer machine.

19. Cutting Tools
Conical Tool Co., 3801 Buchanan, S. W., Grand Rapids 8, Mich. Heavy-duty end mills, flute ball ends, combination fly cutters and boring tools.

20. Cross Slide Table
Lawrence H. Cook, Inc., 67 Massasoit Ave., East Providence 14, R. I. Precision cross slide table for angle, radii and contour milling on all vertical milling machines.

21. Surface Grinder
Covel Mfg. Co., Benton Harbor, Mich. No. 17, 10 by 16 inch hand feed surface grinder.

22. Decimal Equivalent Chart
Dayton Rogers Mfg. Co., Minneapolis 7D, Minn. Combination Decimal Equivalent Chart and Calendar.

23. Cams
George L. Detterbeck Co., 1871 Clybourn Ave., Chicago 14, Ill. Cutting cams, high-speed steel and carbide form tools, special cutting tools, drill bushings and so on.

24. Machine Vise
DeWitt Equipment Corp., 190 Elizabeth Ave., Newark 8, N. J. Complete information on the Abwood Precision Machine Vise.

25. End Mill Speed Selector
The DoAll Co., Des Plaines, Ill. Shop wall chart which is an aid to the selection of proper end mill speeds for specific applications.

26. Top Jaws
DuPage Machine Co., Box 204-L, Elmhurst, Ill. Standard Soft-Blank Top Jaws.

27. Tapping Attachment
Ettco Tool and Machine Co., Inc., 598 Johnson Ave., Brooklyn 37, N. Y. Ettco-Emrick attachments for tapping and threading.

28. Carbides
Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. Current data on Firthite NHA—a high production general purpose carbide.

29. Honing Equipment
C. Allen Fulmer Co., 1233 First National Bank Bldg., Cincinnati 2, Ohio. Cylinder blocks, connecting rods, blind end cylinders, hydraulic cylinders, valves, gears and so on.

30. Permanent Magnet
General Electric Co., Metallurgical Products Division, Detroit 32, Mich. Three vital functions concerning permanent magnets.

31. Small Tools
George Gorton Machine Co., 1705 Racine St., Racine, Wis. Complete line of small tools and accessories including master copy type.

32. Metal Cleaning Machine
Graymills Corp., 3769 N. Lincoln Ave., Chicago 13, Ill. Cold solvent type metal cleaning machines and parts washers.

33. Hydraulic Power Bender
Greenlee Tool Co., Rockford, Ill. No. 884 Light Weight Hydraulic Power Bender for bending pipe and conduit has full 90 degree bend with one ram stroke.

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34. Magnetic Chuck
Hanchett Magna-Lock, Inc., Big Rapids, Mich. Information concerning Magnetic Chucks and Magnetic Holding Devices.

35. Jig and Fixture
Harco Engineering, 12092 Woodbine Ave., Detroit 39, Mich. Fixture clamps, fixture keys, cams, screws, nuts, washers, handles, hand knobs and hand wheels.

36. Holding Devices
Heinrich Tools, Inc., Dept. 117E, Racine, Wis. Rise and fixture base, band saw vise, safety drill vise, self-centering air vise and so on.

37. Drill Jig
Heuser Mfg. Co., 1640 N. Paulina St., Chicago 22, Ill. John's Drill Jig for cross or end drilling round, hexagon, or square stock or standard or odd shaped rough castings from ⅛ inch to 8 inches outside diameter.

38. Gas Preparation Unit
Hevi-Duty Electric Co., Milwaukee 1, Wis. Model Cu 200-P Panel Type Gas Preparation Unit.

39. Iron Bender
Hossfeld Mfg. Co., Iron Bender Division, 402 W. Third St., Winona, Minn. Universal Wrenchless Type Iron Bender.

40. Automatic Sizing Controls
C. E. Johansson Gage Co., 10641 Haggerty Ave., Box 4086 Northeastern Station, Dearborn 1, Mich. CEJ-Deltameter for automatic sizing and machine control.

41. Wheel Dressing Process
Jones and Lamson Machine Co., 521 Clinton St., Springfield, Vt., and Koebel Diamond Tool Co., 9456 Grinnell, Detroit 13, Mich. Actual application in industry of CDP (cemented diamond particles) cutters to the automating of production-line grinding machines.

42. Parts Feeders
Kenhos Corp., 275 Connecticut Ave., Norwalk, Conn. Complete line of vibratory parts feeders, orientation tracks, remote central drive, units, blank base units and so on.

43. Profiling Tools
Kennametal, Inc., Latrobe, Pa. Four styles of Kendex Carbide Profiling Tools with a total of 18 standard variations in dimensions.

44. Optical Tooling Equipment
Keuffel and Esser Co., Hoboken, N. J. Jig transits, alignment telescopes and paragon tilting levels.

45. Collapsible Tap
Landis Machine Co., Waynesboro, Pa. Style Alt Collapsible Taps.

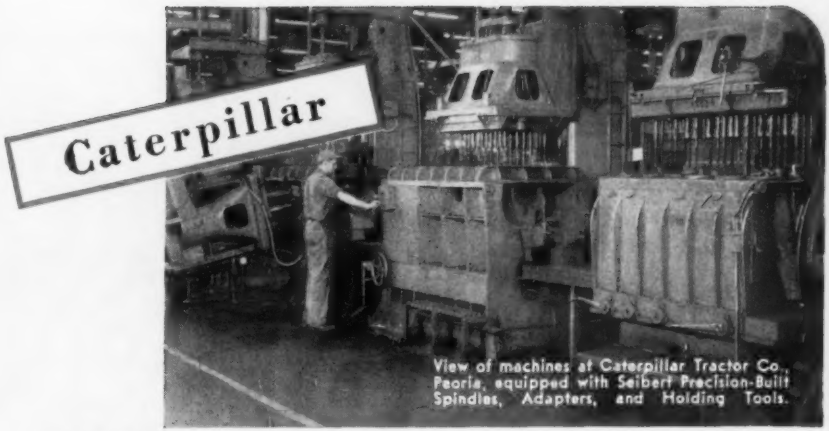
46. Reamer Selector
Lavallee and Ide, Inc., Chicopee, Mass. Comparative Reamer Selector featuring decimal equivalents from 0.0400 to 3.0000 inches.

47. Engine Lathe
The R. K. LeBlond Machine Tool Co., Madison and Edwards Rds., Cincinnati 8, Ohio. 20 inch heavy-duty engine lathe for ceramic and carbide tools.

48. Welding Process
Linde Air Products Division, Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y. Booklet features comparison of covered electrode welding to unionarc welding.

49. Lathes
The Lodge and Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio. 10 inch hi-turn, powerturn engine, toolmaker and gap lathes, powerturn features and so on.

50. Hydraulic Devices
Logansport Machine Co., Inc., 801 Center Ave., Logansport, Ind. "The Facts of Life" on air and hydraulic devices.



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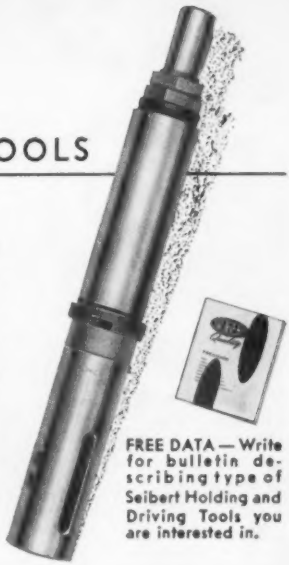

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51. Milling Cutter
McCrosky Tool Corp., Meadville, Pa. Data relative to Series 900 Super-Jack Milling Cutters.

52. Lighting Equipment
McGill Mfg. Co., Inc., 850 N. Campbell St., Valparaiso, Ind. Complete line of switches, lampholders, lamp guards and so on.

53. Penetrant Materials
Magnaflux Corp., 7323 West Ainslie Ave., Chicago 31, Ill. Zyglo and Zyglo-Penetrex fluorescent penetrant testing.

54. Drill Rod
Marshall Steel Co., Box 108-M, La-Grange, Ill. Oil hardening and commercial water hardening drill rod.

55. Drill Jig
Mathewson Machine Works, 40 Hancock St., Quincy, Mass. Adjustable drill jig eliminates layout and cuts drilling time.

56. Vee Drive
Maurey Mfg. Corp., Catalog Division, 2915 S. Wabash Ave., Chicago 16, Ill. Size data on bushed type and fixed bore type cast iron and pressed vee pulleys, refrigeration fans and fan pulleys and vee drive accessories.

57. Subland Drills
Mohawk Tools, Inc., 910 E. Main St., Montpelier, Ohio, does not offer step drills, as indicated on Page 172 of May issue. Item should have read: Information on advantages of Subland two-diameter drilling.

58. Motorized Head
Multiplex Co., 1536 Getty St., Muskegon, Mich. Motorized head with manual indexing used horizontally or vertically.

59. Drill Chuck
Karl A. Neise, 404 Fourth Ave., Dept. MMS, New York 16, N. Y. The Rapid Drill Chuck—a Swedish self-centering drill chuck with ball bearings.

60. Offset Rolls
Niagara Machine and Tool Works, Buffalo 11, N. Y. Offset rolls and gages that reduce industrial pipe and elbow edging to a single operation.

61. Hand Knobs
Northwestern Tool and Engineering Co., 119 Hollier Ave., Dayton 3, Ohio. Star type through tap or ream and hexagon type blind tap or ream aluminum hand knob.

62. Press Brake
O'Neil-Irwin Mfg. Co., 306 Eighth Ave., Lake City, Minn. Di-Acro Hydra-Power Press Brake Model 16-36 and 18-48 with stroke adjustment.

63. Spot Welder
Peer, Inc., Welding Equipment Division, Benton Harbor, Mich. "Standard line" spot and projection welders and "special resistance welders."

64. Gaging Plug Chart
Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford, Conn. Select-Aire Chart showing standard air-o limit gage plugs for comparators with Jacobs chucks.

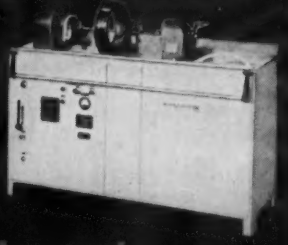
65. Die Sets
The Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Conn. Die sets, die springs and other die makers' accessories.

66. Hydraulic Pallet Truck
The Raymond Corp., 88-150 Madison Ave., Greene, N. Y. Lightweight hydraulic pallet truck with capacity of 2,000 pounds and 4 inch standard lift.

67. Assembly Machine
Omer E. Robbins Co., 24800 Plymouth Rd., Detroit 39, Mich. "Assemblimatic" special assembly machines for milling, grinding, boring and drilling.

68. Small Wheel Grinder
Rotor Tool Co., Cleveland 32, Ohio. 1170 Series Air Powered Small Wheel Grinders.

Magnaglo®
INSPECTION



protects your investment . . .

SUPREME QUALITY R 1923 - 1957

You always get this . . . **not this**

CIRCLE R quality in fine saws and other circular metal cutting tools is controlled—and cost is lowered—with Magnaglo Inspection. For you, our use of this scientific method practically eliminates your down time due to usual defects in cutting tools.

Consult CIRCLE R Specialists in —

Burbank	Hackensack	New York City	Pittsburgh
Chicago	Indianapolis	Philadelphia	Providence
Cleveland	Kansas City	Montreal	Rochester
Dayton	Milwaukee	Phoenix	St. Louis
Detroit			Westbury, L. I.

CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

Specialists in Circular Cutting Tools Since 1923

SEND FOR CATALOG O

METAL SLITTING SAWS
COPPER SLITTING SAWS
SCREW SLOTTING SAWS
COMMUTATOR SLOTTING SAWS
JEWELERS' SLOTTING SAWS
CUT OFF SAWS • CIRCULAR KNIVES & ROTARY SHEAR BLADES • CIRCOLOY STEEL SAWS • SOLID & TIPPED TUNGSTEN CARBIDE SAWS
COMBINED DRILLS & COUNTERSINKS • CENTER REAMERS

For more data circle **419** on Reader Service Card

69. Centerless Grinder
Royal Master, Inc., State Highway 23, Riverdale, N. J. TG-12 centerless Grinder with thrufeed, plunge feed and infeed.

70. Toolholders
RoyEL Tools, 4221 Excelsior Blvd., Minneapolis 16, Minn. No. 3-RDH and No. 4-RDH adjustable floating drill and reamer holders.

71. Power Press
Sales Service Machine Tool Co., 2355 University Ave., St. Paul 14, Minn. Press-Rite single stroke non-repeat power press is operated mechanically with two positive cams.

72. Set Screw
Set Screw and Mfg. Co., Bartlett, Ill. Current data on Zip-Grip, Off-Set, Point-Lok and Flush-Lok self-locking screws.

73. Lathe
The Sidney Machine Tool Co., Sidney, Ohio. Model 32 Heavy-Duty Dial-Master Lathe.

74. Tapping Chart
Snow Mfg. Co., Bellwood, Ill. Per cent of thread chart for tapping.

75. Bench Lathe
South Bend Lathe Works, South Bend 22, Ind. 9-inch precision bench lathe.

76. Gaging Techniques
Standard Pressed Steel Co., Jenkintown 22, Pa. Information available concerning thread-gaging techniques.

77. Soluble Oil
D. A. Stuart Oil Co., Ltd., 2727 South Troy St., Chicago 23, Ill. Dasco D-20 Heavy-Duty Soluble Oil for metal cutting and grinding.

78. Collet and Feeder
Sutton Tool Co., Sturgis, Mich. Standard and Master collets and feeders, collet and feeder tubes, spools and bushings and workholding devices.

79. Balancing Machine
Taylor Dynamometer and Machine Co., Milwaukee, Wis. The Hi-EFF Precision Balancing Machine.

80. Hydraulic Cylinder
Vickers, Inc., Detroit 32, Mich. "Compact" hydraulic cylinder for 2,000 p.s.i. working pressure.

81. Single Point Tool
The Viking Tool Co., 1000 Nichols Rd., P. O. Box 471, Shelton, Conn. Single point tools featuring utilodex holders for throwaway inserts.

82. Radial Drill Press
Walker-Turner Division, Rockwell Manufacturing Co., 400 North Lexington Ave., Pittsburgh 8, Pa. Radial Drill presses with drilling range for full versatility.

83. Toolholder
Warner Development Co., South Beloit, Ill. "Spee-D-Thred" — toolholder for cutting threads.

84. Horizontal Redraw Press
The Waterbury Farrel Foundry and Machine Co., Waterbury, Conn. Horizontal, automatic redraw press.

85. Optical Height Gage
Webber Gage Co., 12912 Triskett Rd., Cleveland 11, Ohio. Micro-accurate optical height gage.

86. Grinder
Wesson Co., Dept. AD, 1220 Woodward Heights Blvd., Detroit 20, Mich. Poweramic Carbide Tool Grinder 56B.

87. Fixture Clamp
West Point Manufacturing Co., 26935 West Seven Mile Rd., Detroit 19, Mich. Wespo fixture clamps.

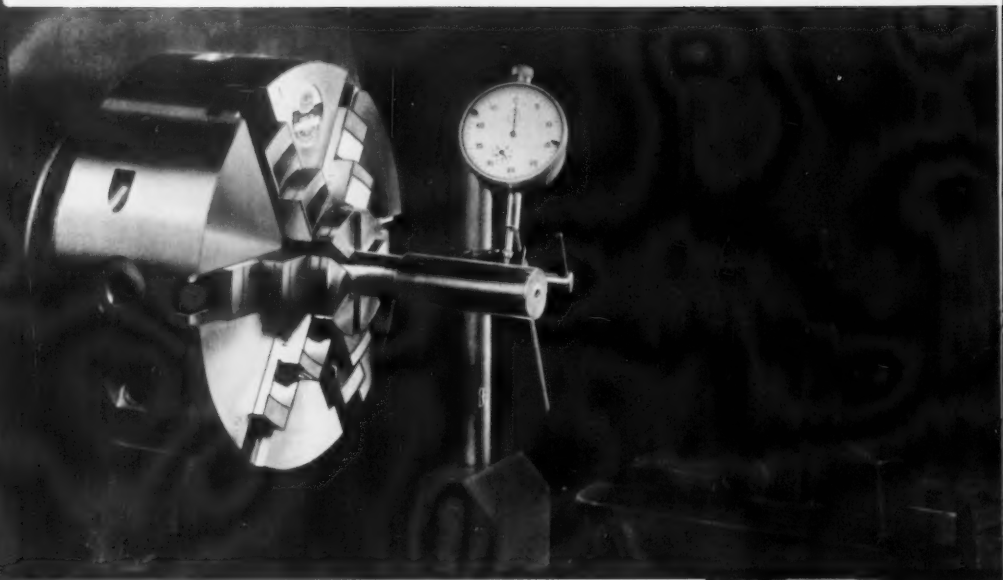
88. Turret Punch Press
Wiedemann Machine Co., 542 Wissahickon Ave., Philadelphia 32, Pa. Turret punch press pierces work to close tolerances at high speed without layout or setup.

Size? Finish? or Both?

Whether you are reaming for size or finish and size; whether your reaming requirements are for a few holes or thousands, you'll find GTD-AMPCO reamers up there among the best. And there is a GTD-AMPCO field engineer at your service in most industrial centers. If you have reaming problems call any Greenfield AMPCO Distributor.

AMPCO TWIST DRILL DIVISION

GREENFIELD TAP AND DIE CORP., GREENFIELD, MASS.



Tru-Set DELIVERS SPINDLE PRECISION TO .0002" T.I.R.

Tru-Set permits you to take full advantage of the precision in your lathe. Completely adjustable, Tru-Set transmits the accuracy of the lathe spindle without variance to .0002" T.I.R., guaranteed. Tool room, as well as production lathes can now deliver the precision that was built into them without being limited to the accuracy of the chuck.

Tru-Set is as economical as it is practical. See your local industrial distributor for the complete story or write direct.

Shown above is the micro-screw adjustment of the chuck back which makes the minimum run-out of .0002" T.I.R. possible.

Available in diameters up to 12" in 3 and 6 jaw styles. All chucks are packed in airtight metal containers.

HORTON Since 1851 CHUCK

HORTON CHUCK DIVISION
GREENFIELD TAP AND DIE CORPORATION
WINDSOR LOCKS, CONN.

West coast warehouse—4312 West Pico Blvd., Los Angeles, Calif.

Low cost–high speed hard-facing with the new METCO THERMOSPRAY process

Hard-facing pump rod with the Metco Type P ThermoSpray Gun

High spraying speeds—high deposit efficiencies —simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOSPRAY GUN and the THERMOSPRAY Hard-Facing Alloys, these disadvantages have been overcome.

The THERMOSPRAY GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMOSPRAY Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed *Metco Process*, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.

METCO

Metallizing Engineering Co., Inc.

1177 Prospect Ave., Westbury, L. I., New York

Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd. Chobham near Woking, England

The following trade names are the property of Metallizing Engineering Co., Inc.: METCO*, ThermoSpray *Reg. U. S. Pat. Off.

Don A. Watson
Metallizing Engineering Co., Inc.
1177 Prospect Ave., Westbury, L. I., N. Y.

Please send me more information

- ☐ about the New ThermoSpray Gun
- ☐ about ThermoSpray Hard-Facing
- ☐ Please arrange a demonstration in my shop.

name_____

company_____

street_____

city_____ zone____ state_____

For more data circle **422** on Reader Service Card

news of the industry

news of the industry

New plants and expansions . . . obituaries . . . anniversaries . . . new appointments.

O. K. TOOL COMPLETES PLANT NO. 4

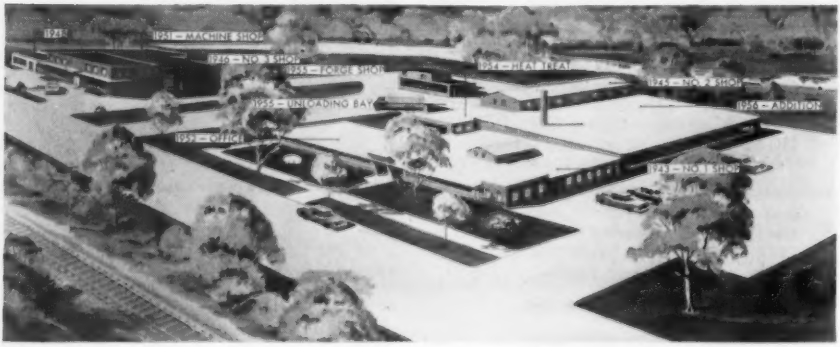
O. K. Tool Co., Milford, N. H., recently completed Plant No. 4, which has 16,500 square feet of floor space. The new facility relieves the crowded condition of the present plant, brought about by the constant expansion of the company's business. Recently, it launched into the solid cutter and end mill field to round out and diversify its line.

The company was established in 1901 and for years its home was at Shelton, Connecticut. The business was purchased in 1949 by Thurston V. Williams and Forrest Hussey and moved to the town of Milford, New Hampshire. These two young men started their careers in a machine shop in a small service station ten years before and prospered during the war years. Today, O. K. Tool Company is a leading manufacturer of metal-cutting tools.

★ ★ ★

SUNNEN PRODUCTS COMMEMORATES 30TH ANNIVERSARY

In commemoration of the 30th anniversary of its incorporation, the Sunnen Products Co., 7910 Manches-


1931 – MACHINE SHOP
1926 – NO. 3 SHOP
1935 – TOOL SHOP
1934 – HEAT TREAT
1935 – UNLOADING BAY
1925 – NO. 2 SHOP
1926 – ADDITION
1927 – OFFICE
1925 – NO. 1 SHOP

Washing drawing of O. K. Tool Company's newly completed Plant No. 4 in Milford, N. H.

ter Ave., St. Louis 17, Mo., manufacturer of automotive service equipment and precision honing machines, recently held an open house which included tours of both Sunnen plants for employees, their families, and guests, demonstrations of industrial honing and automotive building equipment, numerous displays and refreshments.

Incorporated on May 7, 1927, the company today has over 300 employees. Its products are sold throughout the United States, Canada, and in over 65 countries. Officers and directors of the company are as follows: Joseph Sunnen, president and treasurer; Robert Sunnen, vice president; David H. Nicholson, vice president and assistant treasurer; August Sunnen, Jr., vice president; Ruth S. Kallaus, secretary; Laura M. Robbins, assistant secretary; C. J. Schuepbach, director; Cornelia Sunnen, director.

★ ★ ★

DAKE COMPLETES NEW PLANT

The Dake Corp., Grand Haven, Mich., recently announced the completion of its new plant at 724 Robbins Rd., Grand Haven Township. The building is 250 feet long and 180 feet wide and includes three 60-foot bays. The central bay is 42 feet high and the other two are 22 feet high, giving ample clearance for moving materials with cranes. The new building was constructed on a 10-acre site immediately south of the city of Grand Haven and the cost of this plant is estimated at more than $500,000.

For more data circle 423 on Reader Service Card

TORQUE CONTROL

TORQUE CONTROL IMPACTOOLS
meet torque specifications 100%

Production checks made by this manufacturer of road building equipment show that new Ingersoll-Rand Torsion-Bar Torque Control Impactools run every nut and cap screw within torque specifications.

Quality Control Improved on 12 Jobs in 3 Departments

1. Cable control assemblies: 5 operations involving torques from 14 to 75 ft. lbs.
2. Scraper Assembly: 6 line jobs using Impactools set for 40, 60, 75 and 80 ft. lbs. torques.
3. Hydraulic control assembly: 1 job running ½" cap screws to 65 ft. lbs. torque.

With the standard impact wrenches previously used, the operators attempted to control torque by length of time the tool impacted. The new Torque Control Impactools shut off instantly and automatically when the preset torque is reached. This simplifies operator training and improves worker morale.

The end result is dependable product performance in the field. This same kind of cost-saving performance can be put to work for your company now. Write for Bulletin 5170.

Ingersoll-Rand
11 Broadway, New York 4, N. Y.
8-525-1
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news of the industry . . .

FOOTE-BURT ACQUIRES A. P. SCHRANER CO.

The Foote-Burt Co., Cleveland, Ohio, recently purchased all of the assets, business and assets leased by the A. P. Schraner Co., also located in Cleveland. This purchase includes a two-story building, machinery, inventories and the right to the name "Schraner," together with patent rights covering the Schraner External Cylindrical Lapping Machines and also the Schraner External Roll Burnishing Machines. The total cost was $285,000.

The company, now located at 3338 Payne Avenue, intends to combine this operation in its main plant and then sell the building and operate under the name of The Foote-Burt Company, Schraner Division.

★ ★ ★

CINCINNATI MILLING APPOINTS OFFICERS

At a recent management conference of The Cincinnati Milling Machine Co., Cincinnati, Ohio, Hayward A. Gay was appointed manager of the Machine Tool Division, and Philip O.

Philip O. Geier, Jr. (left); Hayward A. Gay

Geier, Jr., was appointed manager of the Products Division. Mr. Gay, a vice president of the company, has managed the Products Division since its establishment in 1944. Mr. Geier has been assistant manager of the Products Division for about a year, having held other positions with this division since 1950.

Mr. Gay was graduated from Ohio State University as a mechanical engineer and from the Harvard Graduate School of Business Administration and has been associated with the company since 1932. Mr. Geier received his earlier education in Cincinnati schools, and was graduated from Williams College and the Harvard Graduate School of Business Administration. He became associated with the company in 1939. He served in the Navy from 1941 to 1946 as aircraft maintenance officer.

★ ★ ★

MONARCH MACHINE TOOL ELECTS NINE DIRECTORS

Shareholders of The Monarch Machine Tool Co., Sidney, Ohio, recently elected nine directors under the new classification system previously approved at their annual meeting. Three directors, with a combined total of 107 years' service on the board, retired.

Alfred J. Sherman (left), and Frank I. O'Leary

For more data circle **425** on Reader Service Card

news of the industry . . .

The directors re-elected Jerome A. Raterman president, and also made him chairman of the board. They also re-elected Stanley A. Brandenburg sales vice president and Kermit T. Kuck engineering vice president; made Fred C. Dull vice president as well as treasurer, elected two new vice presidents and created the additional positions of assistant treasurer and assistant secretary. Alfred J. Sherman, general superintendent since 1947, was made vice president in charge of manufacturing. Frank I. O'Leary, director of industrial relations, was made vice president in charge of industrial relations. Frank J. Graziano, executive assistant, was elected secretary, while Robert M. Peters, comptroller, and Walter O. Faulkner, purchasing agent, were made assistant treasurer and assistant secretary, respectively.

Eight directors re-elected were: Fred C. Dull, John F. Herkenhoff, Kermit T. Kuck, Jerome A. Raterman, L. L. Warriner, William W. Weis, James T. Wilson and Jesse G. Wright. A Clevelander, Elmore L. Andrews, was added to the board to fill the vacancy caused by the death of Wendell E. Whipp, chairman of the board of Monarch Machine Tool Company.

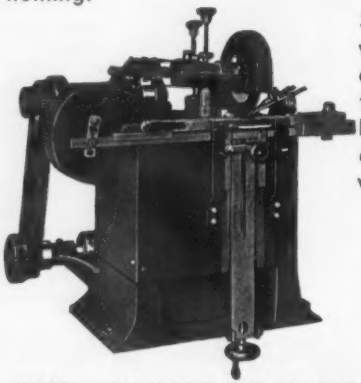
★ ★ ★

MASERATI CORPORATION MOVES TO NEW AND LARGER QUARTERS

The Maserati Corporation of America, Westbury, N. Y., recently moved to new and larger quarters at 46 Sea Cliff Ave., Glen Cove, L. I., in order to accommodate an increased stock of machine tool equipment, parts and demonstration units. The modern, air

WARDWELL Combination Grinder Quickly Pays for Itself . . . . .

This amazing machine will sharpen a gross of Hack Saw Blades at least 6 times, and actually save its cost. Thereafter it is yours—has cost you nothing.



Sharpens Band and Circular Saws too, with the same money saving. Does not depend on shape of grinding wheel to form shape of teeth.

Don't junk used saws. Use them over and over again by sharpening them with the WARDWELL EC Grinder.

Write for Bulletin EC

WARDWELL MANUFACTURING CO.
3803 Ridge Rd., Cleveland 9, O.

MAKER OF LARGEST LINE OF SAW AND TOOL SHARPENING MACHINES

For more data circle 426 on Reader Service Card

Allison
Abrasive Cutting Wheels

Abrasive Cutting Know-How

Know-How is just as vital to top performance in abrasive cutting as in any other machine tool operation

FINE FINISH and NO BURNING with ABRASIVE CUTTING in YOUR TOOL ROOM

for fast, cost-saving, fine-finish cuts of such Tool Room materials as these...

- **High Speed Steel**
- **Tool Steel**
- **Heat Treated Steel**
- **Oil Hardening, Air Hardening and Shock Resistant Alloys**

Nearly everyone knows that Abrasive Cutting is the fastest, lowest-cost means of cutting the tougher, harder metals...at cutting speeds of 6 to 10 seconds per square inch of cut...in sizes ranging from the smallest stock to 12″ x 12″ solid billets and 14″ diameter tubing.

But many metal-working men are not yet aware of the fact that these same Abrasive Cutting benefits of speed and low cost are applicable to critical Tool Room Materials...that abrasive cuts of heat-sensitive metals can be made with Fine Finish and No Burning, Checks or Cracks.

It's not a trick...it's a matter of Know-How...the kind of Know-How that is available to you through your Allison Field Engineer, an experienced Abrasive Cutting Specialist. He is likely to prescribe wet cutting for most tool room metals...dry cutting for metals adversely affected by the quenching action of coolants ...wheels with the types and sizes of abrasive grains, the particular bond and hardness that fit the jobs to be done...thin wheels (available from Allison from .006″ thickness) and special spindle speeds for fine slotting...quick, economical methods of salvaging worn tools or cutting blanks of stock for special tools needed in a hurry.

***For more complete information** write for this helpful booklet—*
ABRASIVE CUTTING BY ALLISON

ACCO

Allison Division • AMERICAN CHAIN & CABLE

254-D Island Brook Avenue, Bridgeport 8, Conn.

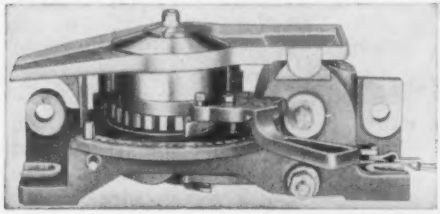
MAKER OF LARGEST LINE OF SAW AND TOOL SHARPENING MACHINES

For more data circle 426 on Reader Service Card

news of the industry . . .

Illustration showing new quarters for Maserati Corporation at Glen Cove, L. I.

conditioned premises, will feature the complete line of precision machine tools and parts imported by the company, with facilities for testing and demonstrating under actual operating conditions. The company stated that purchasers of machine tool and allied equipment will henceforth be assured of immediate and complete service selection of in-stock machinery.



1200 PIECES

PER HOUR

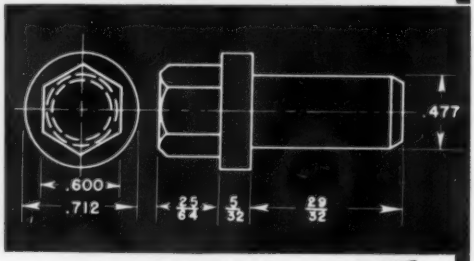
This piece was made from brass rod and slotted as shown in the print below. Production on this item was 1,200 pieces per hour.

DEARBORN

Automatic Chucking and Indexing Fixture

FEATURES:

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from 1/32" to 2".

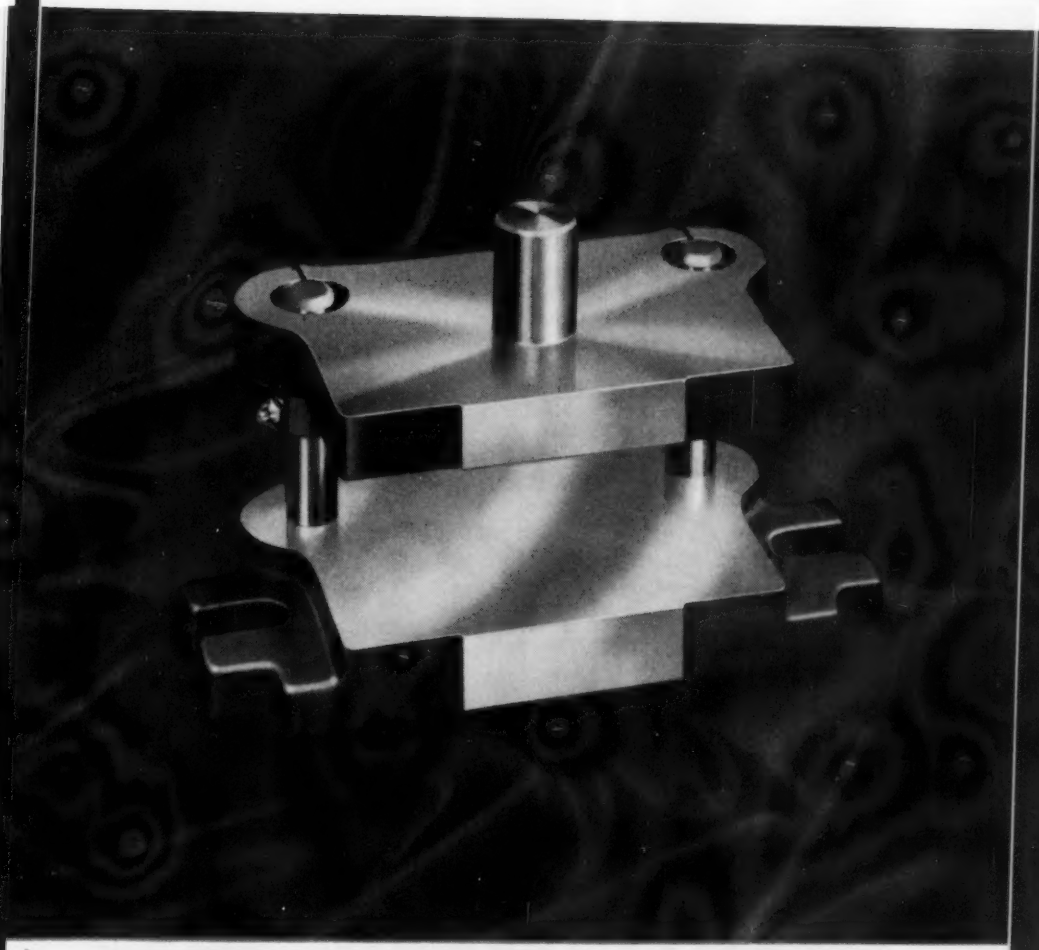


J. W. DEARBORN

ANSONIA • CONN.

Write for illustrated data. Send blueprints or specifications of work.

For more data circle 428 on Reader Service Card



THIS IS RIDICULOUS...

No one's seen a die set as shiny-bright as this one. It's always buried away in a punch press, dirty and oily, banging out piece after piece, day after day.

And each one of those pieces is just alike within thousandths of an inch. That's production precision. And it's why you use a die set—to maintain that precision.

Detroit die sets meet all the precision requirements of a die set, in parallelism, squareness and finish. Ask for your copy of our new catalog today.

OFFICES IN PRINCIPAL INDUSTRIAL CENTERS

Detroit DIE SET CORPORATION

2695 WEST GRAND BOULEVARD • DETROIT 2, MICH.

ANSONIA • CONN.

For more data circle 428 on Reader Service Card

news of the industry . . .

NATIONAL ACME ENLARGES AND MODERNIZES MAIN OFFICE FACILITIES

The construction for enlarged and modernized office facilities totaling $250,000 was recently started by The National Acme Co., Cleveland, Ohio. When completed, 9,000 square feet of new area will have been added to the main office. The addition will take the form of a two-story building, plus basement section, having three 29 by 112 foot floor areas. Features of the new construction will include centralized air conditioning and luminous ceilings that will provide diffused illumination averaging 75 foot candles. In addition, the present lobby will be redecorated and paneled to conform with the decor of the new section.

★ ★ ★

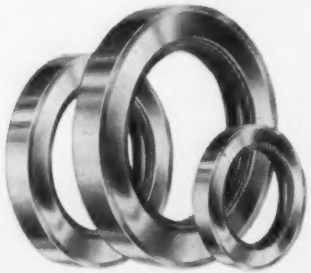
NATCO EXPANDS MAIN PLANT

National Automatic Tool Co., Inc., Richmond, Ind., has recently added a 75 by 530 foot building to its main plant. This addition increases manufacturing space by 30 per cent. It provides more assembly area, and makes possible more rapid shipment of finished products. This latest step in Natco's plant expansion program brings the firm's floor space to a total of 342,000 square feet and also makes room for newly purchased equipment.

It was necessary to build the new addition so that Natco could shorten critical

C/R OIL SEALS

THOUSANDS OF SIZES . . . THOUSANDS FROM STOCK



More than 20 types, forming over 7,500 size combinations for shafts from ¼" to 50" O.D. are available . . . the majority from stock! C/R shaft type oil seals fit most seal applications . . . from simple dust exclusion to high-speed, high-temperature fluid retention under extremely rugged operating conditions where high sealing efficiency must be maintained over long service life.

Check C/R . . . you'll find the seal to solve your problem . . . probably available for prompt delivery from stock.

This new, comprehensive catalog of stock C/R Oil Seals is now ready for your use. Write for your free copy.

CHICAGO RAWHIDE MFG. CO.
1233 Elston Avenue Chicago 22, Illinois
Hamilton, Ontario
IN CANADA: Chicago Rawhide Mfg. Co., Ltd.,
EXPORT SALES: Geon International Corporation, Great Neck, New York

SIRVENE C/R DIVISION
CHICAGO RAWHIDE

For more data circle 430 on Reader Service Card

DIE SET CORPORATION

2895 WEST GRAND BOULEVARD • DETROIT 2, MICH.

For more data circle **429** on Reader Service Card

PRODUCTION TOOLING SIMPLIFIED AT EASTMAN KODAK COMPANY

"The Sentry Diamond Block Atmosphere Makes the Difference"

Sentry DIAMOND Block

QUALITY TOOL HARDENING REQUIRED

Sentry Furnaces have been used at Eastman Kodak for many years to harden all types of special high speed steel for tools, such as the perforators and circular form tool blanks shown at the left.

Quality tools are essential for economical production of Kodak's precision photographic equipment. Sentry hardening protects quality, thereby promotes economy.

SENTRY METHOD EASY TO OPERATE

The Sentry Diamond Block Atmosphere is chemically constant and truly neutral, requiring no analysis or regulation. Hence the operator concerns himself solely with tool hardening production.

Ask for Catalog P-23

QUALITY RESULTS EVERY TIME

Sentry Furnaces harden all H. S. Steel tools completely free from scale and decarburization. Ample soak assures full hardness, with sharp edges maintained exactly as before hardening.

Sentry
TRADEMARK
ELECTRIC FURNACES
THE SENTRY CO.
FOXBORO, MASS.

For more data circle **431** on Reader Service Card

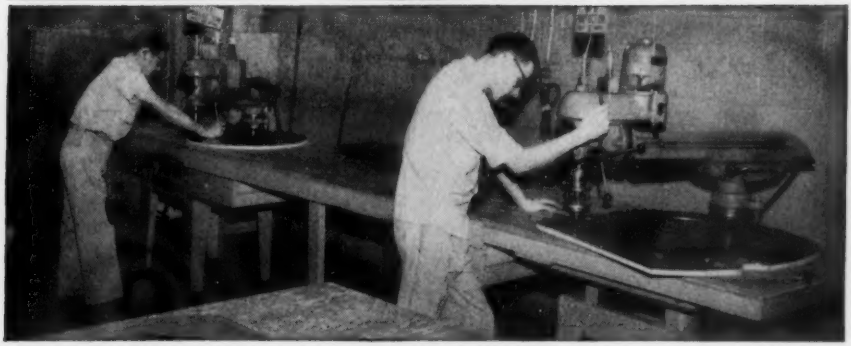
Interior of addition to the plant of National Automatic Tool Co., Richmond, Ind.

delivery dates in the rapidly expanding machine tool market. Standard, high-bay, flat construction, along with smooth, golden brick outside walls, limestone window sills and frosted hammered Evalite glass windows, give the building a modern look, plus ample light on the inside of same.

For more data circle **432** on Reader Service Card

For more data circle **433** on Reader Service Card

INDUSTRY REPORTS ON WT ALKER-URNER



At North American Aviation, Columbus, O.

WALKER-TURNER RADIAL DRILLS IN CONSTANT USE FOR 6 YEARS—AND STILL GOING STRONG!

Two of these Walker-Turner radial drill presses are utilized in a unique production-line operation for making all router jigs in the Template Fabrication Department.

In this application, positioning holes are drilled in the jig on the first press. Then the work is passed to the second machine, where the operator drills or countersinks the holes as necessary. It's a fast, efficient method for machining all sizes and shapes of router jigs, with a minimum of set-up time.

The Company has found the versatility, rugged construction, and low maintenance of these radial drill presses and other Walker-Turner "Light-Heavyweights" also make them ideal for many tooling and production jobs in other departments.

NOW—A New W-T Radial DRILL PRESS That's Even Better!

With its all-new head assembly, this design offers all the ruggedness, versatility and efficiency of larger, expensive machine tools. Available in 24 models—4¼" or 6" spindle travel.

Ask your Walker-Turner distributor for a demonstration. He is listed under "Tools" in your telephone book. Or write for literature.

walker-Turner

WALKER-TURNER
Division of Rockwell Manufacturing Company
Dept WG-22, 400 N. Lexington Ave.
Pittsburgh 8, Pa.

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news of the industry . . .

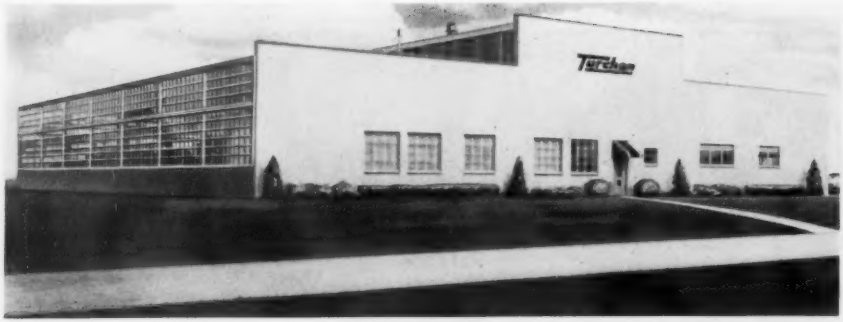


Illustration showing new plant of Turchan Follower Machine Co., Inkster, Michigan

The company has more than 50 years' experience in producing single and multiple spindle drilling, boring, facing and tapping machines, as well as special automatic machines for mechanized high production. In 1932, Natco introduced an automatic transfer machine to the machine tool industry. Since then it has supplied thousands of mechanized lines, mainly to the automotive, appliance, machinery and electrical industries.

★ ★ ★

TURCHAN MOVES TO INKSTER, MICHIGAN

Turchan Follower Machine Co., formerly of Detroit, recently moved into its new building at 26950 Van Born Road, Inkster, Michigan. The new plant provides 20,000 square feet of floor space to accommodate greatly increased engineering, experimental and manufacturing facilities. An area devoted entirely to demonstrations of tracer controlled attachments for all types of machine tools is also provided in the new building.

The Turchan Follower Machine Company pioneered hydraulic tracer controls and recently developed, engineered and is the exclusive manufacturer of the Hydro-Magnetic Tracer, a unit, which, according to company officials, has revolutionized hydraulic tracers for machine tools. The company was established in 1933.

REDUCE TOOL GRINDING TIME

with PRE-GROUND COMBINATION Right & Left Hand TOOL BIT COBALT STEEL

Grind tool end only . . . Lasts longer . . . Hollow ground

Trial bit, ⅜" sq. x 3", only $1.75 postpaid

Available all sizes . . prices on request . . quantity discounts

TOOL-CRAFT CO., HACKETTSTOWN, N. J.

For more data circle 435 on Reader Service Card

"SEALFLEX" TUBING

Leakproof— Stays in place
For Coolants, Cutting Oils, Solvents

Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in ⅛", ¼", ⅜", ½", ¾" I.D. Write for bulletin and prices.

VERMONT FLEXIBLE TUBING CO.
Lyndonville, Vermont

For more data circle 436 on Reader Service Card

SET UP TIME Cut In Half With

...SUNDSTRAND MAGNETIC CHUCKS

This drum type rotary milling machine has been provided with Sundstrand magnetic chucks to hold 16 different sizes of bearing caps. Production has been increased approximately 25% and set up time cut in half over former method of holding.

This is another example of the profitable application of Sundstrand magnetic chucks to existing equipment.

ADDITIONAL DATA ....

. . . is available on many interesting and profitable Sundstrand magnetic clamping fixture applications. Write for your copy today. Ask for Bulletin 581-M.

SUNDSTRAND POWER-GRIP ®

SUNDSTRAND
Magnetic Products Co.
Division of Sundstrand Machine Tool Co.
1020-9th ST. • ROCKFORD, ILLINOIS

For more data circle **437** on Reader Service Card

Make 3 hammers AT ONCE!

It's the NEW, easy, economical, quick way to mold your own lead hammers on a production basis with "SHUR-GRIP" handles and this COOK production mold.

COMPLETE LEAD HAMMER SERVICE

Write for circular and prices

LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle **438** on Reader Service Card

HARGRAVE CLAMPS

Complete Line of Clamps for all Purposes

Individually Power Tested for Better Performance.

"C", Steel Bar, Quick Acting, Wood Hand Screws, Welders

WRITE FOR FREE CATALOG.

Showing Clamps, Chisels, Punches, Masonry Drills for hand and power hammers, Carbide Drills, Washer Cutters, and File Cleaners.

Stocked by Your Local Distributor.

THE CINCINNATI TOOL COMPANY

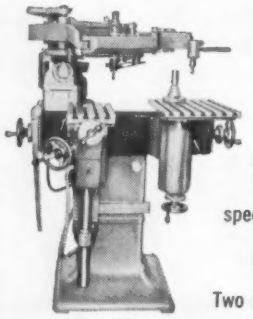
1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle **439** on Reader Service Card

ALEXANDER

die sinkers

for 2 or 3 dimensional work



Latest model, No. 3A for molds and dies up to 1000 lbs. Ratios from 1.5:1 to 10:1, 14 spindle speeds from 475 to 9500 rpm, cutters up to 3/8" dia. Two smaller sizes, 1A and 2A.

Write for Catalog C on these quality, British machines.

J. ARTHUR DEAKIN & SON

150-28 HILLSIDE AVE., JAMAICA 32, N. Y.

For more data circle **440** on Reader Service Card

news of the industry . . .

ALVA ALLEN PURCHASES PATENT RIGHTS

Alva Allen Industries, Clinton, Mo., recently announced the acquisition of the Canadian and American patent rights of the Marvel Milling Attachment for lathes, from the designer, Michael Hanna of Earlington, Ky. The Marvel Milling Attachment is easily installed on practically any conventional lathe, enabling the performance of many milling operations, such as keyseating, grinding, milling, drilling and boring. This attachment was redesigned for improved ruggedness, stability, dependability and to permit quantity production, after which it won Award of Merit at National Inventors Congress Convention.

★ ★ ★

JOSEPH B. ARMITAGE

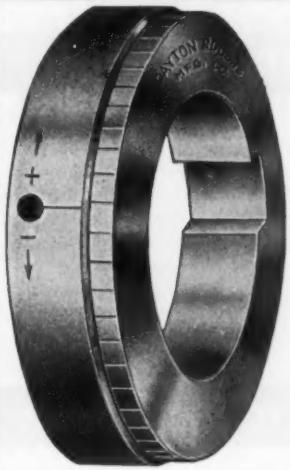
Joseph B. Armitage, 76, consultant-vice-president at Kearney & Trecker since 1955, passed away recently. Mr. Armitage joined the Milwaukee machine tool manufacturer in 1920 as chief engineer and held this position until 1943 when he was elected vice president in charge of engineering. During his 37 year career at Kearney & Trecker, he was credited with 121 patents in the machine tool field.

Mr. Armitage was a member and director at large of the American Society of Mechanical Engineers, and in October, 1955, received this organization's highest award when he was named honorary member which carries with it a lifetime membership. He was past chairman of the Society of American Engineers, Milwaukee Section, as well as a director and member of the Milwaukee Engineering Society, and held a membership in the Newcomen Society, a group devoted to the study of material history.

industry news in brief . . .

Robert W. Hoefler appointed assistant sales manager, **Verson Allsteel Press Company,** Chicago, Illinois.

Crotts and Saunders Engineering, Inc., 235 North Main Street, Winston-Salem, North Carolina, appointed representative for North and South Carolina and parts of Virginia, **The Sheffield Corporation,** Dayton, Ohio. **O. A. Ahlers,** in charge of overall direction of the Machine Tool, Contract Manufacturing and Threadwell - Conway Tap and Die Product Divisions; **W. Fay Aller** appointed vice president to supervise and coordinate the company's Autometrology, Standard Production Instruments, and Fixed Gage and Inspection Instruments Divisions; **J. T. Welch** named assistant vice president for coordinating the operations of the company's national field sales organizations; **C. H. Reynolds** in charge of Mount Clemens, Michigan, Cleveland, Ohio and Windsor, Ontario, Canada areas; and **William I. Wilt** named assistant vice president, Standard Production Instrument Division. **E. M. Hakanson** appointed manager and **C. H. Laemmel** named asistant manager of Machine Tool Division; **D. H. McConnell** appointed manager of Autometrology Division and **Henry Boppel** and **Arthur Wiseman** named assistant managers; **Robert Esken** named su-



MILLING MACHINE SPACING COLLARS

Save Time

ON GANG MILLING SET-UPS

These MICROMETER ADJUSTABLE SPACING COLLARS are designed for accurate spacing of side milling cutters, gang milling and various other multiple setups on milling machines. Accurate spacing of the milling cutters is easily made by merely loosening the cutter arbor nut and making a plus or minus adjustment.

You will be assured of a QUICK, ACCURATE and POSITIVE ADJUSTMENT at all times.

For immediate delivery specify size and mail orders to . . . . .

Size of Cutter Arbor	Maximum Outside Diameter	Price
⅞	1-9/16	$12.75
1	1-13/16	12.75
1¼	2-1/16	13.25
1½	2-7/16	13.25
1¾	2-3/4	16.75
2	3-1/16	19.50

DAYTON ROGERS *Manufacturing Company*

MINNEAPOLIS 7D, MINNESOTA

For more data circle 441 on Reader Service Card

For more data circle 440 on Reader Service Card

to the study of material history.

industry news in brief . . .

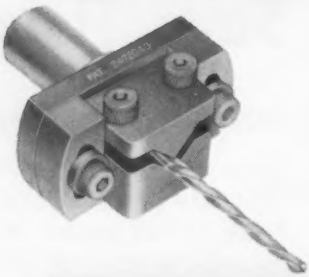
pervisor Autometrology Mechanical Engineering and Sales and **Charles Brooks** named assistant supervisor; **Robert Youngberg** appointed supervisor of Autometrology electrical engineering and **Eugene Brinck** named estimator and service supervisor, of Autometrology. **Colonel William J. Darmody** appointed head of basic and advanced metrology and measurement standards research.

Thomas F. Nakles appointed general manager, **Firth Sterling (Canada) Ltd., Brantford**, Ontario.

Hunt Truck Sales and Service Company, 211 South Tampa Street, Tampa, Florida, and 2155 North West 26th Street, Miami, Florida, named exclusive franchise representative for industrial lift trucks in central and southern Florida, **The Yale and Towne Manufacturing Company**, Yale Materials Division, Philadelphia, Pennsylvania. **William H. Mathers** elected vice president and secretary upon the retirement of **Fred Dunning** after 35 years with the company.

Production Tool and Gage Company, 468 Monroe Avenue, Rochester, New York, appointed sales representative and **Alan Korest**, 900 Monroe Avenue, Northwest, Grand Rapids, Michigan, appointed sales representative, **Size Control Company**, Chicago, Illinois.

ACCURATE SET-UPS FAST!



Accurate, rapid set-ups the first time, every time . . . is the reason Brookfield Tool Holders are now widely used in practically every metalworking plant in the country. With one Brookfield Tool Holder, you can cut your stock of bushings by at least 100. Here's why:

BROOKFIELD TOOL HOLDERS

ADJUSTABLE V JAW holds wide range of tool diameters without bushings or accessories.

AXIALLY TRUE DESIGN makes perfect tool alignment almost automatic.

BALANCED-PRESSURE LOCKING ASSEMBLY maintains uniform seating, eliminates creep or shift.

EASY TO USE — just slip tool in the jaw, tighten, then float tool into dead center and lock.

AVAILABLE IN A WIDE RANGE OF SIZES

MODEL NO.	HOLDING RANGE	SHANK DIA.
BA-10	1/64"–3/16"	5/8"
DA-10	1/64"–1/2"	5/8"
DA-12	1/64"–1/2"	3/4"
GA-12	1/16"–3/4"	3/4"
GA-16	1/16"–3/4"	1"
KA-16	1/8"–1"	1"
KA-24	1/8"–1"	1 1/2"
PA-24	1/4"–1 1/2"	1 1/2"
PA-28	1/4"–1 1/2"	1 3/4"

WRITE FOR ILLUSTRATED CATALOG AND PRICES!

BROOKFIELD, INCORPORATED

STOUGHTON 1111, MASSACHUSETTS

For more data circle 442 on Reader Service Card

J. Waldron Julian elected assistant treasurer, **Besly-Welles Corporation,** South Beloit, Illinois.

The Triplex Machine Tool Company, 75 West Street, New York 6, New York, appointed exclusive agent in the territory of eastern New York, northern New Jersey and Connecticut, **The Cleveland Punch and Shear Works,** Cleveland, Ohio. **The Keller Machinery Company,** 1807 Elmwood Avenue, Buffalo 7, New York, appointed exclusive agent for Buffalo, Rochester and western New York state. **The Swind Machinery Company,** Suburban Station Building, Philadelphia, Pennsylvania, appointed exclusive agent.

John N. Miller appointed manager, processing development and methods, **Gairing Tool Company,** Detroit, Michigan. **Arthur L. Saull** appointed factory manager, **Harry Tuscher** appointed manager of plant engineering, **Frank J. Goddard** appointed manager of the estimating department and **Carl Krueger** appointed manager of engineering.

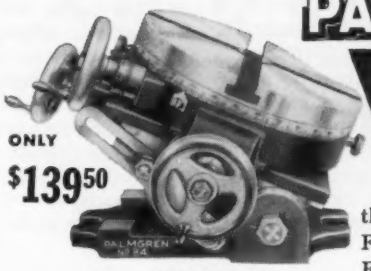
The Satterlee Company, 2200 East Franklin Avenue, Minneapolis 4, Minnesota, appointed distributor in Minnesota and Northwestern Wisconsin, **Niagara Machine and Tool Works,** Buffalo, New York.

Dale R. Versaw appointed purchasing agent, **Kennametal, Inc.,** Latrobe, Pennsylvania.

SPEED UP PRODUCTION...SAVE TIME and MONEY with this new

PALMGREN

Rotary, Index Milling Table



ONLY **$139.50**

No. 84 Table

PATENT APPLIED FOR

that combines Rotary Feed and Two Cross Feeds in one unit, Plus a 90° Angle Tilting feature.

Here is a table that can be used as an angle plate as well as for laying out work. It's a compact, versatile table for accurate performance in any shop, for hundreds of time-saving jobs on drill presses or milling machines. Quickly adjustable to any angle up to 90°. This new No. 84 Tilting, Indexing and Rotary Table has an 8" diameter top graduated for the full 360°. Center is bored for 1½" locating plug. Rotary Feed dial is 1½" diameter and graduated in 3 minute graduations. Cross Feed dials are 1" and graduated in thousandths. Indexing attachment is easily and quickly attached to rotary hand wheel shaft. Base width 5", length 9¾". Feed is positive with a gear ratio of 40-1.

Send for Bulletin No. 205

CHICAGO TOOL AND ENGINEERING CO.

8389 South Chicago Ave. • Chicago 17, Illinois

For more data circle 443 on Reader Service Card

For more data circle 442 on Reader Service Card

Page
184

new shop equipment

new shop equipment

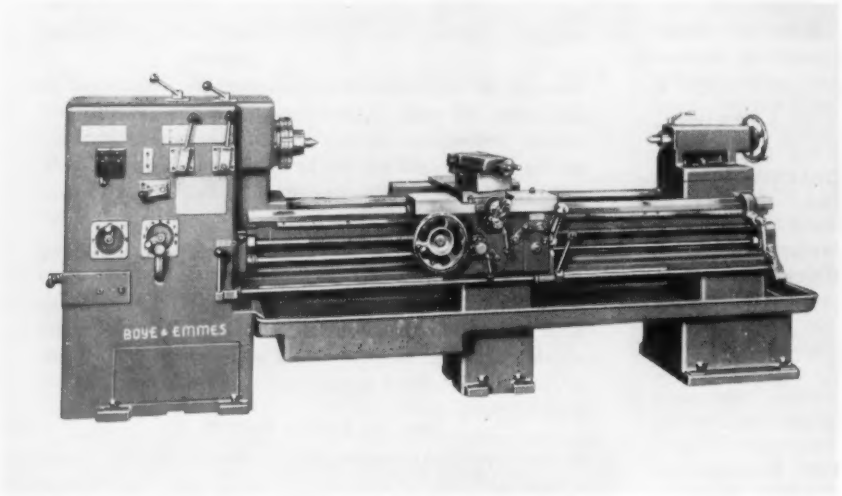
Descriptions of new machines, tools and materials for metalworking.

SPEED LATHE DESIGNED TO GIVE EIGHTEEN DIFFERENT SPEEDS

The Boye and Emmes Machine Tool Co., 123 Caldwell Dr., Cincinnati 16, Ohio, has announced its 2516 Series CB2 Lathe. This lathe has been designed to give dimensions of 25 inches maximum swing clearance over the bed and carriage wings and 16 inches over the cross slide. One of the features of the lathe is the headstock design. The back gear shaft and gears are located in front of the spindle, where the downward pressure of the gears neutralizes the effect of the tool lift under heavy cuts.

This lathe is built with hardened taper key drive or camlock spindle nose, hardened and ground steel bed vees, power rapid traverse, electrical stops, both longitudinal and crossfeed, with spindle speeds ranging up to 1,500 revolutions per minute. The 2516 Series Speed Lathe is available with 18 speeds.

For more data circle 89 on Reader Service Card



Boye and Emmes 2516 Series CB2 Speed Lathe features 25 inch swing over the bed

For more data circle 443 on Reader Service Card

Page 185

and shop materials

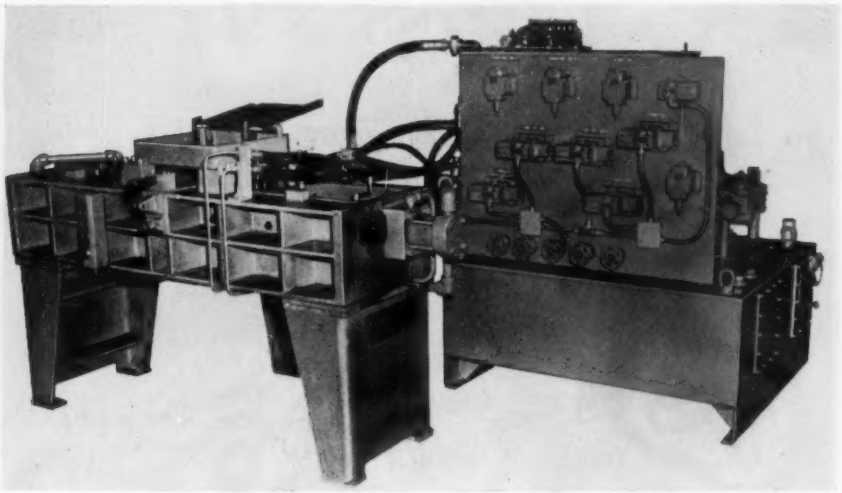
new shop materials

DOUBLE END TUBE FORMING MACHINE IS HYDRAULICALLY OPERATED

The Vaill Engineering Co., 133 East Main St., Waterbury 20, Conn., has introduced its Series 700 Automatic Double End Tube Forming Machine. Completely hydraulically operated, the machine has a smooth motion to form high quality tube end shapes at high production rates. The tube is transferred from a gravity magazine to the work position, clamped, formed and ejected automatically. This machine can be arranged for double operation work through the use of double stroking work slides with the indexing of the forming tools between each stroke.

This machine can be tooled to expand and reduce in diameter, bead, flare and flange the ends of tubing in various sizes and lengths. Combinations of these shapes may be obtained through the use of the double stroking feature.

For more data circle 90 on Reader Service Card



Vaill Series 700 Hydraulically Operated Automatic Double End Tube Forming Machine

new shop equipment . . .

BAR FEED IS IMPROVED

Boyar-Schultz Corp., 2020 South 25th Ave., Dept. C-N, Broadview, Ill., recently announced improvements in its Model S Hydra-Lite Hydraulic Bar Feed, which has been designed to feed stock accurately, even at the high spindle speeds designed into late model single spindle screw machines.

Its features offer a compact, trouble free unit. A short piston allows feeding of stock at highest spindle speeds without stopping the spindle—no feed fingers to gall or mar stock—positive feed out is said to insure control of lengths within a few thousandths. The Swing Stop is an accessory that is claimed to control length of piece part as accurately as turret stop.

With the Hydra-Lite there is a minimum of bar end waste, and still only one feed out required to feed parts any desired length. It is necessary to use a second operation clutch to assure trouble free operation.

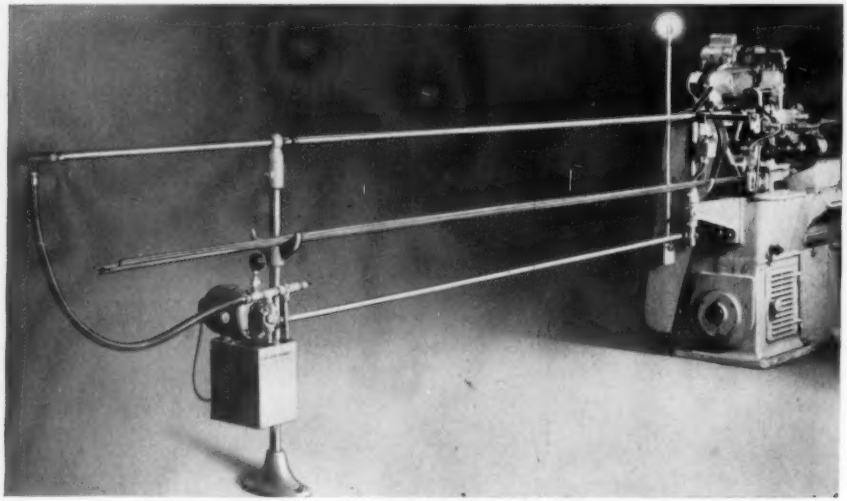
A signal light warns the operator when the machine is running out of stock. Capacities from 3/32 inch to 1¾ inches are available in three different size units.

For more data circle **91** on Reader Service Card

★ ★ ★

SURFACE GRINDER HAS BUILT-IN EXHAUST AND WET GRINDING SYSTEM

Maserati Corp. of America, Dept. M, Westbury, L. I., N. Y., has announced the addition of the Blohm "Simplex" Surface Grinder to the HFS series, which features simplified controls and a built-in exhaust and wet grinding system. The square design base is said to provide the utmost in structural rigidity and, in conjunction with the 5½ h.p. Blohm motorized spindle, affords unusually high precision results with good surface fin-



Boyar-Schultz Improved Model S Hydra-Lite Hydraulic Bar Feed feeds stock accurately

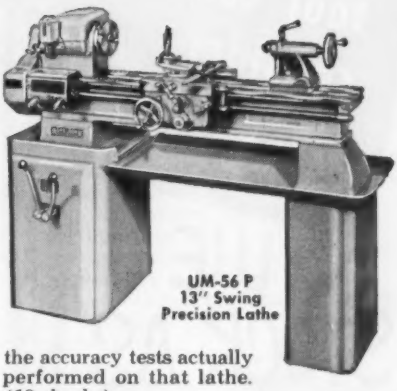
SHELDON Precision LATHES

for the size Lathes You Need Most

Sheldon lathes are built in the sizes you need most, for toolroom and production jobs. They are available with swings of 10", 11" and 13". . . in varying bed lengths with 18" to 48" center distances . . . and . . . in your choice of pedestal, cabinet or bench mountings.

Powerful, all-V-belt, drive units—either the standard 8-speed (or 16-speed) E-drive; or the production favorite, a rapid, lever-shift U-drive. Where higher spindle speeds are desired, the standard E-drive can be built to provide speeds up to 2,000 r.p.m.

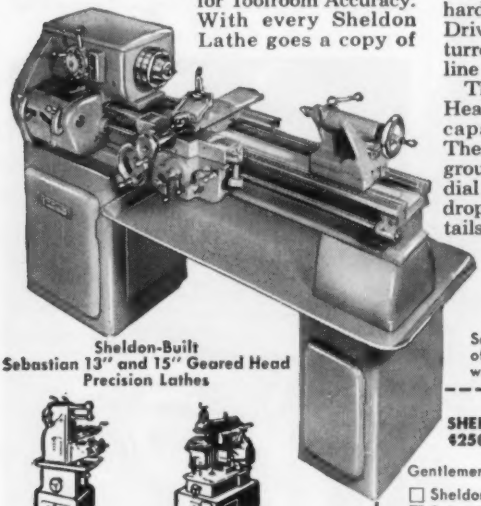
All Sheldon Lathes have handscraped, built-in precision. Each lathe is guaranteed to meet or surpass the American Standards for Toolroom Accuracy. With every Sheldon Lathe goes a copy of the accuracy tests actually performed on that lathe. (19 checks).



UM-56 P
13" Swing
Precision Lathe

Important optional features include: hardened bed ways, L00 Long Taper Key Drive spindles, 4" D1 Camlock spindles, bed turrets, taper attachments and a complete line of toolroom and production accessories.

The new Sheldon-built Sebastian Geared Head Lathes have greatly increased work capacity and many advanced features. These include a wide, heavy, hardened and ground bed . . . easy shifting spindle speed dial . . . 60-pitch gear box . . . independent drop lever apron clutches . . . cam-action tailstock clamp . . . and, automatic lubrication in the headstock and apron with "1-shot" lubrication of carriage.



Sheldon-Built
Sebastian 13" and 15" Geared Head
Precision Lathes

SHELDON
Horizontal Milling Machine

SHELDON
12" Shaper

SHELDON MACHINE CO., Inc.

Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes.

4250 North Knox Ave., Chicago 41, Ill.

Send in coupon or write for catalogs and names of nearest Sheldon and Sebastian Distributors where you can see these new lathes in operation.

SHELDON MACHINE CO., INC.
4250 North Knox Avenue, Chicago 41, Illinois

Gentlemen: Please send new catalogs describing:

☐ Sheldon ☐ 10", ☐ 11' ☐ 13" Lathes
☐ Sebastian 13" and 15' Geared Head Lathes
☐ Horizontal Milling Machine ☐ Name of Local Dealer
☐ Sheldon 12" Shaper ☐ Have representative Call

Name ..... Title .....

Company Name .....

Street Address ..... ☐ Company ☐ Home

City ..... State .....

For more data circle **444** on Reader Service Card

What other tool companies consider "SPECIALS" (IN DECIMAL SIZES)

...WE STOCK AS STANDARD

Thousands of chucking and Stub Reamers by the .001 in Stock ready for the precise job. Why buy or make "SPECIALS" when you can BUY from STOCK — over night.

SUPERREAM

IN EMERGENCY
Telephone
Libertyville 2-4200

TWENTIETH CENTURY MANUFACTURING CO.

BOX 429-M
LIBERTYVILLE, ILL.

For more data circle 445 on Reader Service Card

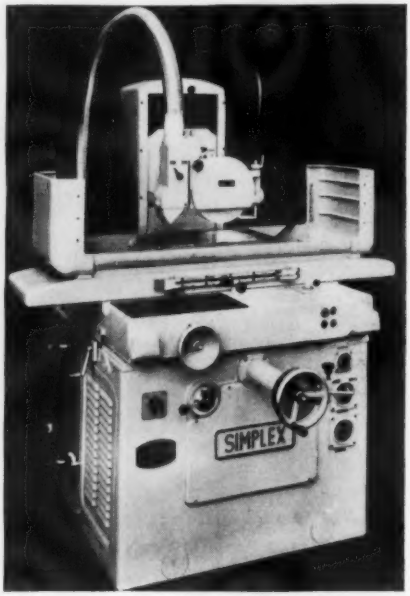
new shop equipment . . .

ish. Standard grinding wheels may be used.

The table rides on specially designed ball bearing slide units which, in turn, ride in hardened, ground and lapped special alloy steel inserted ways. Hydraulic longitudinal table actuation, variable from 0 to 85 inches per minute, and electrically actuated cross travel variable from 0.004 inch to 2½ inches per table reciprocation, is provided. The machine has a grinding capacity of 12 inches wide by 20 inches long and permits a maximum of 14¾ inches from the centerline of the spindle to the table top.

A complete line of accessories is available for use with the Blohm "Simplex" Grinder.

For more data circle **92** on Reader Service Card



Blohm "Simplex" Surface Grinding Machine

4250 North Knox Ave., Chicago 41, Ill. City ..... State .....

For more data circle **444** on Reader Service Card

Q S A

Motch & Merryweather's

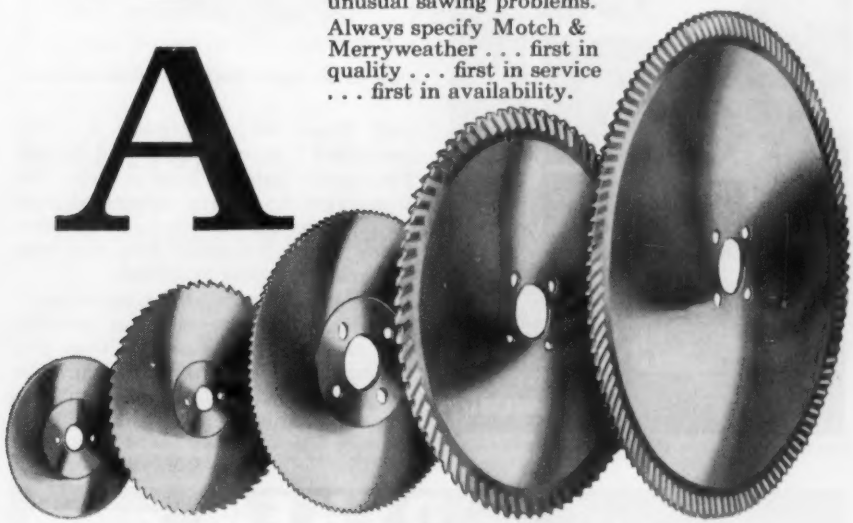
Quality, Service and Availability add up to lower production costs

Triple Chip cut-off blades and slitting saws—characterized by a specially-developed tooth form—cut faster and last longer.

M&M's factory repair, resharpening and resegmenting service, the fastest in the industry, helps you avoid excessive inventories . . . minimizes costly downtime.

The complete line of M&M cutting tools, stocked by M&M distributors strategically located in every important industrial area, enables you to get immediate delivery on the tools you need, when you need them. Sawing and cutting tool specialists are always available to help you solve tough or unusual sawing problems.

Always specify Motch & Merryweather . . . first in quality . . . first in service . . . first in availability.



FREE—*Send today for your copy of M & M's Circular Sawing Handbook, a pocket-sized guide to sawing operations.*

THE MOTCH & MERRYWEATHER MACHINERY CO.

Cutting Tool Manufacturing Division

Cleveland 17, Ohio

For more data circle **446** on Reader Service Card

new shop equipment . . .

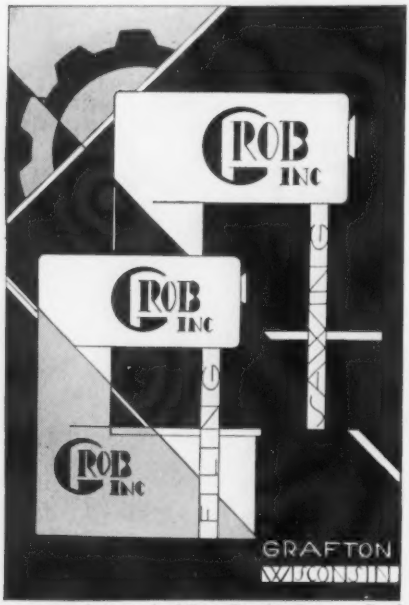
GRINDING MACHINE HAS BUILT-IN DUST COLLECTING SYSTEM

To its line of 12 and 14 inch size GRIND-Air-resters (grinders with self-contained dust collecting systems), The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, has added 7, 8 and 10 inch size models. The sturdy cabinet base contains the dust collecting system, assembled complete with the heavy-duty grinder. Floor space compares with the conventional grinding machine.

View of Standard Electrical GRIND-Air-rester

The unit, shown in the accompanying illustration, arrests the grinding grit and dust at its source, thus protecting workers' health and minimizing the exposure of the adjacent machinery to this harmful grit and dust.

For more data circle **93** on Reader Service Card



For more data circle **447** on Reader Service Card

DYKEM STEEL BLUE
Stops Losses
making Dies and Templates
Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
Write for sample on company letterhead
THE DYKEM COMPANY
2301F North 11th St. • St. Louis 6, Mo.
DYKEM STEEL BLUE
SPECIMEN
With DYKEM Steel Blue
Without DYKEM Steel Blue
For more data circle **448** on Reader Service Card

CASE HISTORY

NEW SPIRAL FLUTE

SOLID CARBIDE ATRAX BURS GIVE REVOLUTIONARY PERFORMANCE!

Another case history proving the superiority of Atrax Solid Carbide Tool Development.

PROBLEM:

Countersink 20 -¼" diameter holes in Hardened Die Set—Rockwell "C"—62-63.

SOLUTION:

New Atrax M-141 bur with right-hand *spiral flutes* was used. Bur was used at 300 RPM and with positive shearing action and excellent chip ride-out produced mirror ground finish. Chamfer was sunk to full diameter of tool which showed no wear after countersinking 20 holes.

This new series of spiral flute burs is produced with extreme accuracy and uniformity on the New Atrax Automatic Bur Grinder.

For production benefits through progress in solid carbide tooling . . . look to Atrax for leadership!

Send for your copy of the 96 page Atrax Catalog today!

THE ATRAX COMPANY
Newington 11, Conn.

For more data circle **449** on Reader Service Card

new shop equipment . . .

HEAVY-DUTY DRILLING UNIT

The Bellows Co., Akron 9, Ohio, has added a heavy-duty drill unit called the "Carbi-Drill" to its line of "Controlled-Air-Power" self-contained work devices.

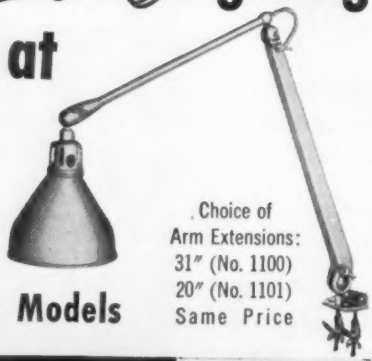
The "Carbi-Drill" is a complete production unit for high-speed drilling, reaming, counterboring, precision boring, spotfacing and similar applications. Tapping may be done by the addition of a tapping head. The unit may be mounted in any position. It weighs 225 pounds with a standard 2 h.p. electric motor. Thirty-five spindle speeds, ranging from 600 to 6,000 r.p.m., are available by changing the timing belt and motor pulley.

The "Carbi-Drill" features adjustable air powered advance to the work, controlled hydraulic feed of the spindle and adjustable air powered rapid return. These controlled movements are accomplished with a Bellows Air Motor and Hydro-Check Inline Power Unit built into the base of the "Carbi-Drill" Unit. According to the manufacturer, the Model BEM-10 (3⅝ inch bore) Air Motor supplies a power thrust to the quill of the drill unit of 10 times applied air line pressure. The Air Motor and Hydro - Check unit, being an assembly in itself, adds to the simplicity of the "Carbi-Drill."

The amount of rapid advance and depth of feed are both electrically controlled and are easily adjusted by

Air-Cooled Lighting by Dazor at Low Cost

Adjustable-Arm Models



Choice of Arm Extensions: 31″ (No. 1100) 20″ (No. 1101) Same Price

Light up machines and benches at rock-bottom cost and get Dazor dependability besides. New Adjustable-Arm Lamps mount solidly, hold fast in any position set. Either top- or side-mounted reflector. Air-cooled housing is safe to handle despite continuous use. Gray baked enamel over bonderizing. Call your Dazor distributor. Dazor Manufacturing Corp., St. Louis 10, Missouri.

...Makers of

DAZOR FLOATING LAMPS

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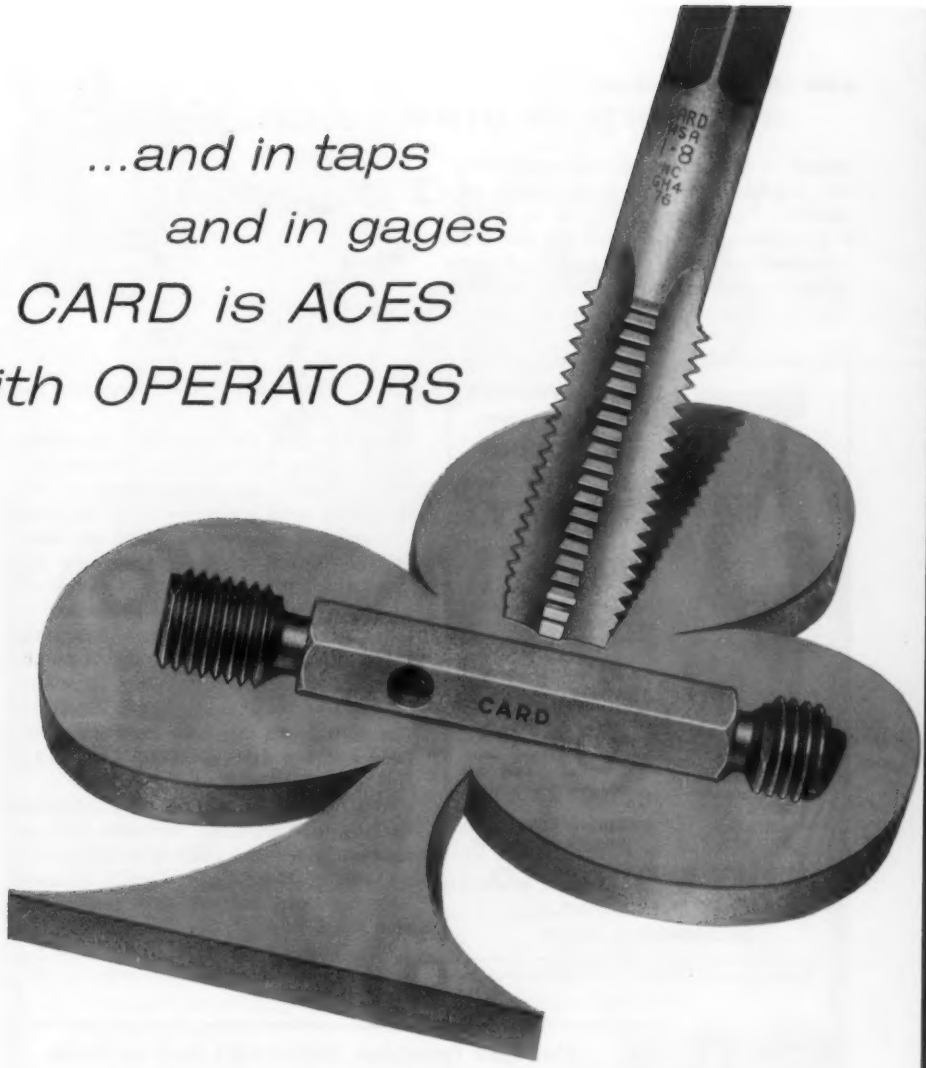
...and in taps and in gages CARD is ACES with OPERATORS



"Card taps and gages are action-mated to the job," are the words actual operators use to describe why they are precise and accurate. Tool after tool . . . shipment after shipment . . . the Card Product is exactly what the operator expected it to be. S. W. CARD DIVISION, Mansfield, Mass. Card Warehouses: Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York, San Francisco.

CARD

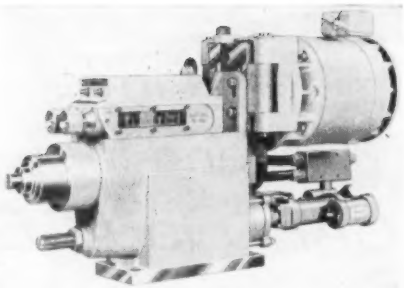
DIVISION OF UNION TWIST DRILL COMPANY

— Serving you through fine distributors from Coast to Coast

For more data circle 451 on Reader Service Card

new shop equipment . . .

means of two external calibrated control knobs. The unit has a fully adjustable length from 1½ to 4 inches with optional stops available for 0 to 4 inches for either the rapid advance or hydraulic feed portion of the stroke. The drilling capacity is up to ⅝ inch diameter drill in mild steel materials.



Bellows "Carbi-Drill" Heavy-Duty Drill Unit

According to the manufacturer, the "Carbi-Drill" is outstanding in the precision and ruggedness of its quill and spindle construction and the manner in which these components are supported and guided. The spindle and quill assembly is built as an integral unit for easy removal from the main housing. Fit of the quill to the bore of the main housing is within 0.0002 to 0.0003 inch. Total runout of the spindle to the base mounting surface will not exceed 0.0005 t.i.r. in the full 4 inch stroke of the unit.

Operatable on single or continuous cycling, all required switches and actuators are built into a compartment on top of the "Carbi-Drill." Manual advance and retract switches are in the front end of the compartment to aid in setting up the unit on the job.

For more data circle **94** on Reader Service Card

Handle your small part precision JIG BORING on the

LINLEY JIG BORER

Why tie up your big, costly jig borers on small work when you can get maximum utility at less cost per hour on a machine exactly fitted to your work. Put your small work on the LINLEY where it belongs and reserve your large machines for large work, where large work belongs. You'll save money this way.

Specifications
Table Movement:
6" x 10"
Table Size:
7" x 17½"

Complete details sent promptly on request

LINLEY BROTHERS CO.
661 State St. Ext.,
BRIDGEPORT 1, CONN.

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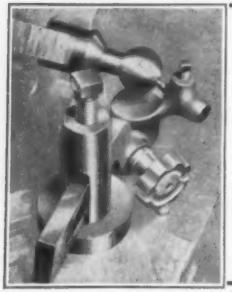

Monarch Precision SHAPLANE Radius Tools

Illustration shows convex cutter for ¼" to 2½" balls.

FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range ½" to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

PATENT PENDING

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4470 Oakenwald Ave., Chicago 15, Ill.

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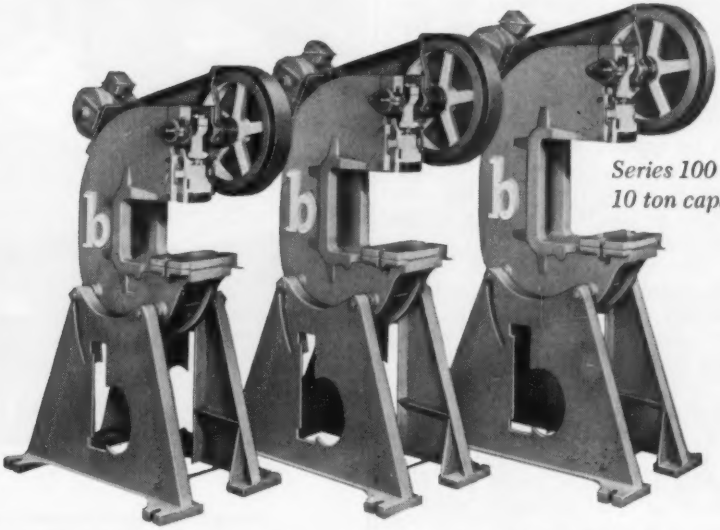
3 NEW HEAVYWEIGHT CHAMPS in benchmaster's growing family!



Series 100
10 ton capacity

Here they are...3 exciting new Deep Throat Benchmasters built with all the pride and craftsmanship of the world's largest manufacturer of small presses and mills! These new models exceed all other Benchmasters in size, weight, work capacity and tonnage! With their sturdy, rigid frames you get all the latest refinements of Benchmaster's long experience in the field...*and remember 60% or more of all small presses sold are Benchmasters!*

For your deep throat requirements, for facilitating large pieces easier, use these new 10-ton Benchmasters... Unmatched for quality, *still* unbeaten for economy!

1835 West Rosecrans,
Gardena, California

benchmaster

World's largest manufacturer of small punch presses and mills

For more data circle 454 on Reader Service Card

new shop equipment . . .

PNEUMATIC DIE CUSHION IS IMPROVED

The Dayton Rogers Manufacturing Co., Minneapolis 7D, Minn., has announced an improved Model RD Pneumatic Die Cushion of all steel construction, which is adapted for all types of inclinable presses which are within its capacity.

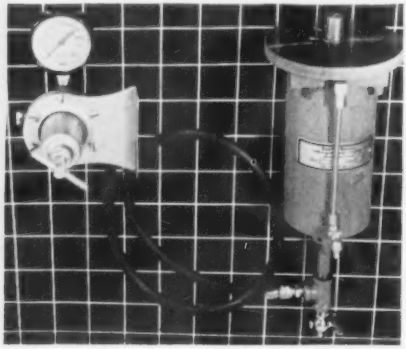
It can be quickly and easily installed on any press application. All that is necessary is to drill and tap one hole, either in the bolster plate or die shoe, for installation.

This pneumatic die cushion equipment is furnished complete with a combination regulating valve and pressure gage, together with all of the necessary fittings for quick installation.

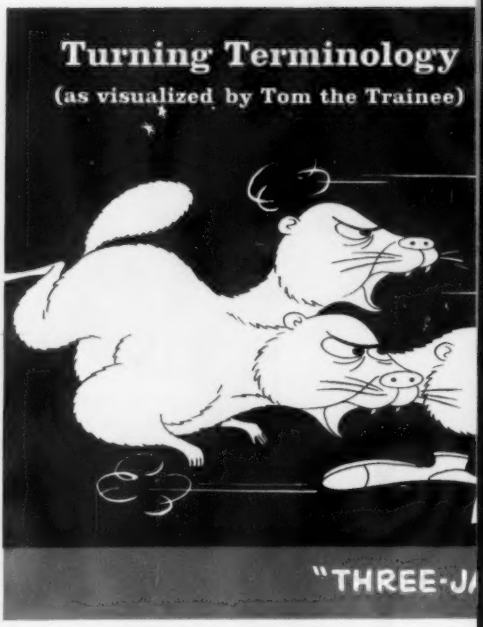
This unit may be connected to any shop airline, and the combination pressure gage and regulating valve can be easily fastened to any side of the inclinable punch press for easy regulating of the required working pressure on a given die tool.

This unit is now made in six sizes: from 2 to 6 inches, having draw ring holding pressure from 0.2 to 1 ton.

For more data circle **95** on Reader Service Card



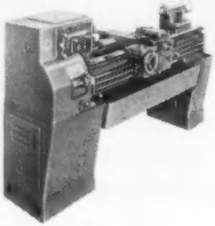
Dayton Rogers RD Pneumatic Die Cushion



Tom will stop running like a scared jack-rabbit and become a "jack-of-all-trades" when he masters all the accessories available with LeBlond Regal lathes. All the chucks, stops and rests that make jobs easier.

Take LeBlond's exclusive Hydra-Trace duplicating attachment. Duplicates any contour from a flat, easy-to-make template. Performs facing, turning or stepless form turning operations. Simple to set up, simple to run.

Then there's the taper attachment. Set it up and leave it installed – doesn't affect normal lathe operation. Cut tapers without disengaging the cross feed screw.



The R. K. LeBl

Cincinnati 8, Ohio
World's Largest Builder
of Lathes for More tha

For more data circle **455**

The Regal is designed for grinding attachments, milling converters, milling and keyway vises, turrets and many other accessories. A fully equipped Regal practically gives you a one-machine machine shop.

Many of LeBlond's big lathe features are found in the Regal. The industry-proven gear-belt headstock drive with 12 speeds, hardened and ground replaceable steel ways using compensating veeway principle, sturdy one-piece apron, both feed rod and leadscrew and the automatically lubricated quick-change box providing 56 feeds or threads.

Regal lathes are available in 13″, 15″, 17″, 19″, 21″, 24″ sizes. Also a 13″ bench model.

WRITE FOR BULLETIN R-201-W

ond Machine Tool Company

of a Complete Line
70 Years

LeBLOND
of Cincinnati

on Reader Service Card

RETRACTABLE ANVIL SNAP GAGE SPEEDS INSPECTION

A dial indicator snap gage, designed to speed inspection operations wherever it is used, is now available from Lincoln Park Industries, Inc., 1719 Ferris Ave., Lincoln Park 25, Mich. In the accompanying illustration, the gage is shown being used to check the rolled spline on an axle shaft. The illustration shows a master setting gage in place, along with a section of the splined axle shaft. The gage is used to check gear tooth pitch diameters.

The chief feature of this gage is the retractable anvil, which results in fast operation and more pieces checked per hour.

Design of this gage is said to assure positive alignment and squareness throughout. There are no pivots, bearings or cams in its internal construction; the only wear points are on the carbide anvils and in the indicator.

This gage is available in size ranges from ¼ inch to 5 inches, with carbide anvils furnished to suit individual job requirements.

For more data circle **96** on Reader Service Card

Lincoln Dial Indicator Snap Gage in use

new shop equipment . . .

INLINE TRANSFER MACHINE AUTOMATICALLY MACHINES 650 PISTONS PER HOUR

An 11 station inline transfer machine, designed and built by Motch and Merryweather Machinery Co., 888 East 70th St., Cleveland, Ohio, automatically performs nine drilling, reaming and milling operations on automotive pistons.

Pistons are delivered dome side down to the first station by a conveyor, where they are automatically accepted and loaded into the machine. Station to station transfer is accomplished by hydraulically operated transfer fingers and a reciprocating transfer bar. After transfer to the second station, the piston is properly oriented in relation to pin bores and bosses by means of an electric eye and orienting table.

At the third station, the piston is pushed down against a positive locator by four expanding lugs. The center of the dome is drilled and two sections of the dome are spotfaced from the bottom upward. These are used as centering and locating points in properly positioning the pistons during the balance of the operations. The two weight pads on the bottom of the piston — which is facing upward in the machine—are milled at the number four station. Drive holes in these weight pads are spot drilled at station five and drilled at station six. They are reamed at the seventh station.

Aget offers more! Over 38 standard Dustkop models to choose from . . . *Plus* engineering service to help you select, provide, and install the proper accessories and fittings to complete your dust collecting system. Write for illustrated folder . . . Today!

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1398E. CHURCH STREET • ADRIAN, MICHIGAN
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TO MEET AND BEAT HIGH PRODUCTION COSTS

compare the blades you're using with STAR

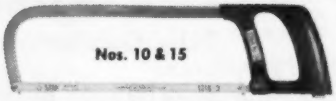
THE STAR BLADES GIVE ALL 5

1. Uniformity in fabrication
2. Proper Hardness
3. Efficient Tooth Design
4. Sufficient Set for Clearance
5. Clearly marked for Ease of Identification

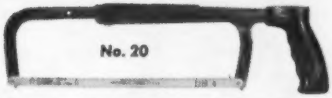
Point 1 OF STAR'S 5 FEATURE CHECKLIST

UNIFORMITY IN FABRICATION

All saw blades are made by a step-by-step process. But the finished blade will be perfect *only* if each preceding step is perfect. Star Blades are uniformly perfect because every step in the Star manufacturing process is done on super-accurate *automatic* machines—under the supervision of highly skilled operators.



No. 10—Green molded handle. Almost indestructible. Shaped for comfort. Patented Lever-Lock positions, tensions blades automatically. **No. 15**—Red molded handle, chrome-plate finish. Same features as No. 10.



Long a favorite with mechanics, this gunmetal finish adjustable pistol-grip frame with lever for lock blade features extra easy blade change.

Clemson Bros., Inc.
Middletown, N.Y., U.S.A.

☐ Please send the STAR Metal Cutting Guide that contains information on blade types, cutting techniques, feeds and speeds and general metal cutting information.

☐ Please send the STAR Metal Cutting Chart—A handy guide for the shop metal worker.

Name_____

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City_____ Zone____ State____

STAR BLADES

Manufactured by

CLEMSON BROS., Inc., Middletown, N. Y., U. S. A.

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Machines

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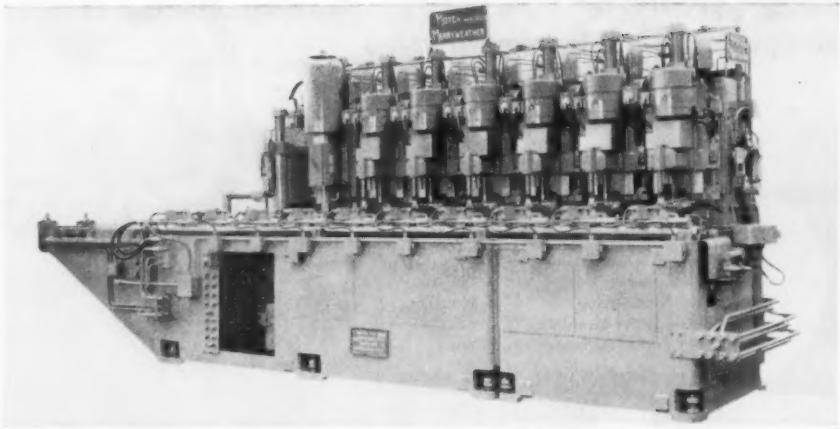
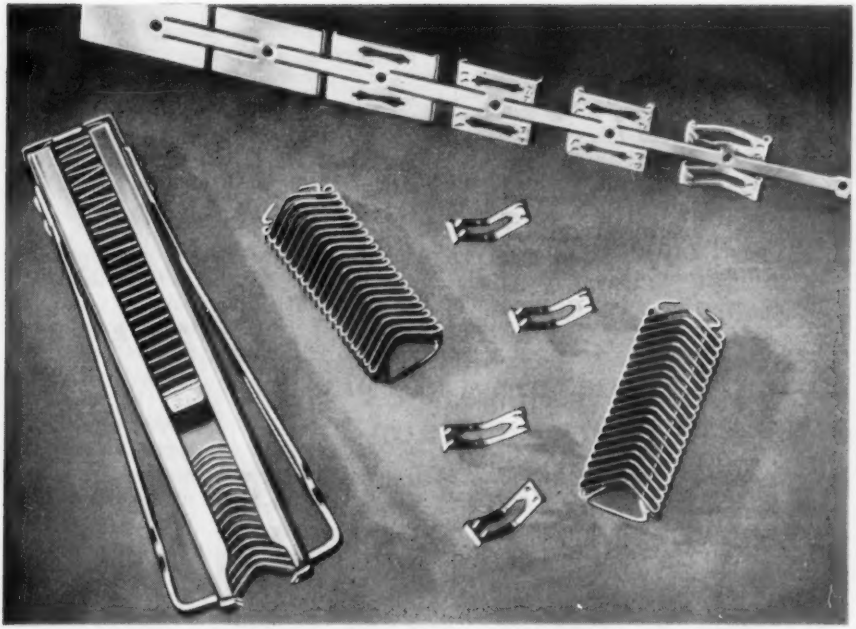


Motch and Merryweather 11 Station Inline Transfer Machine drills, reams and mills

At the eighth station, two oil holes are drilled through half of the pin boss. Using these holes as approaches, two oil holes are then drilled halfway

For more data circle 458 on Reader Service Card



Above: The various steps in forming Autoclips® from Anaconda 18% Nickel Silver strip, .637" wide by .013" thick. Below are individual Autoclips and those mounted in wire holders ready for insertion in Autoclip Applier, at left. Exclusive wholesale distributor for Autoclip is Clay-Adams, Inc., New York City. ***Below, left:*** Autoclips being used to attach skin towel to edges of incision.

Anaconda Technical Service helped in

Selecting the exact Nickel Silver strip for this surgical clip

THE PROBLEM: The Technical Oil Tool Corporation, Los Angeles, developed Autoclip, an automatic magazine-type clip and applier to close wounds or incisions faster and easier. Selecting the right metal for the clip was the problem. A certain amount of tension was required to hold the wound edges together during healing, with the least amount of damage to tissues. In addition, the clip had to open easily for painless removal. The metal should be easy to form, and retain sharp, die-cut edges.

THE SOLUTION: After several unsuccessful attempts with various metals, sample clips of the required gage were made of Nickel Silver. These silvery white copper-alloys have excellent resistance to corrosion in service or in storage and have been time-tested for surgical instruments and equipment. Technical specialists of The American Brass Company suggested Nickel Silver, 18%-719—one of four standard Anaconda Nickel Silver Alloys—as the one best suited to meet all the requirements including tension, formability, clean edges and sharp points.

FREE TECHNICAL SERVICE: Metallurgists and technical specialists in The American Brass Company, through their day-to-day work with a great variety of metal problems, offer a tremendous breadth of experience. And this experience is at your disposal—to help you select the exact alloy, form, temper for your job. Call your American Brass Company representative, or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA®

COPPER, BRASS, BRONZE and NICKEL SILVER

Made by The American Brass Company

For more data circle **459** on Reader Service Card

new shop equipment . . .

through the other half of the pin boss at the ninth station. The tenth station completes the drilling through of these oil holes. When the piston reaches the eleventh and last station, chips and coolant are dumped, and the part is automatically unloaded to a conveyor.

According to the manufacturer, this inline transfer machine is capable of automatically machining 650 pistons per hour at 100 per cent efficiency.

For more data circle **97** on Reader Service Card

★ ★ ★

AUTOMATIC GAGE CHECKS WALL AND BOTTOM THICKNESS OF ALUMINUM TUBES

An automatic gaging machine that checks the wall and bottom thickness of tubing and automatically separates them into good, rectifiable and rejected categories at the rate of 1,000 units per hour was announced recently by the Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford, Connecticut.

Known as the Automatic Tube Thickness Gaging Machine, the device is said to be capable of rapid automatic gaging of all types of applications where the wall thickness, the end thickness and the diameter of tubbing are to be gaged.

Aluminum tubes are fed into a chute from which they are transferred to a nest of rubber rolls rotating at approximately 600 r.p.m. As the tubes rotate, gaging contacts enter the open ends,

Prompt Service on RAYMOND Chrome Vanadium

DIE SPRINGS

STOCK OR SPECIAL SIZES

MEDIUM, MEDIUM-HEAVY, HEAVY DUTY

Distributed by leading die set manufacturers

Wide variety of hole and rod sizes, lengths and deflections. Increased fatigue life. Reduced down time. *Write for specifications and price list, and name of nearest distributor.*

RAYMOND Manufacturing Co.

DIVISION OF ASSOCIATED SPRING CORPORATION

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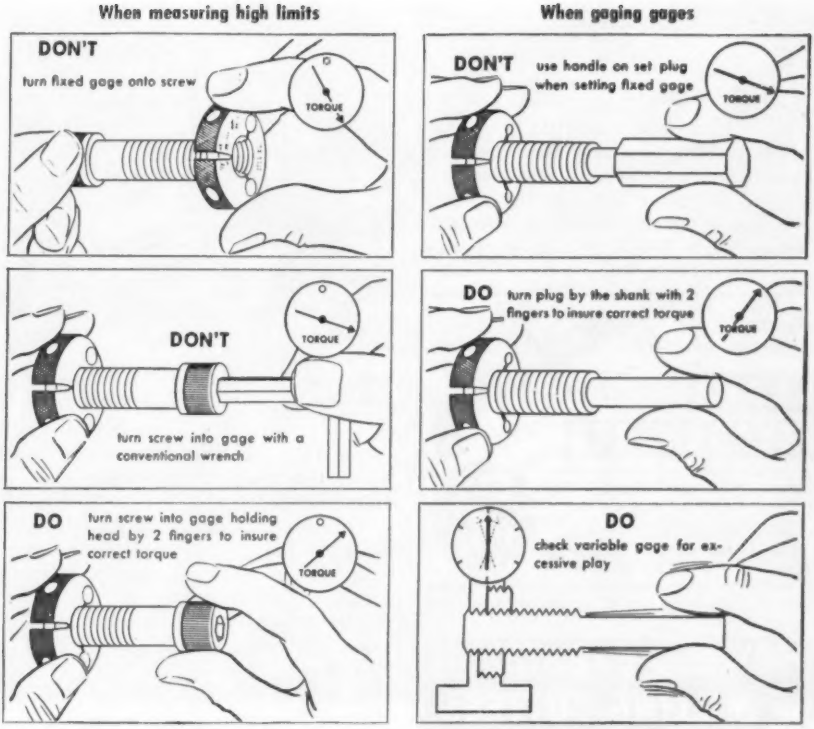


These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

3A threads: what they are; how to gage them—new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

All standard UNBRAKO socket screw products fall within specified tolerance limits no matter what method is used to gage them. Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for your free copy today.

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION

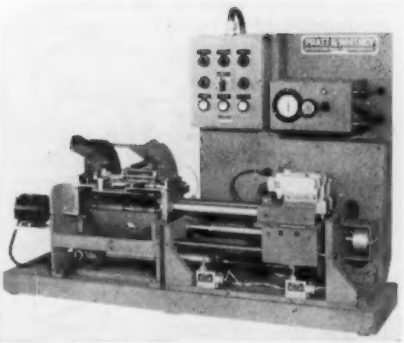
SPS

JENKINTOWN PENNSYLVANIA

For more data circle 461 on Reader Service Card

new shop equipment . . .

exploring the wall thickness on the helix that is generated. At the end of the stroke, bottom thickness is measured. After the gaging slides are retracted at faster than gaging speed, the contacts operate two Sigmatic Microlimit gage heads which sort the



Pratt and Whitney Automatic Tube Thickness Gaging Machine with panels removed

tubes into classification conveyors which discharge them into bins of usable, rectifiable and rejected units.

Though the machine was initially designed for a specific gaging application, it can be adapted to a wide range of gaging operations where wall thickness, end thickness and diameter are to be measured in similarly shaped tubes.

For more data circle **98** on Reader Service Card

★ ★ ★

AUTOMATION SYSTEM INTEGRATES FUNCTIONS OF FOUR GEAR SHAVERS

A simplified system, that completely integrates the feed and control functions of four individual Red Ring

Quick Shipment on
TAPER ATTACHMENTS
For All Lathes—Old or New—
9" to 36" Swing
Write for Bulletin
MASTER-TAPER COMPANY
4531 N. Beacon St., Chicago 40
Excl. Mfrs. of Taper Attachments
$29.50 to $149.50

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HOWALD CARBIDE MILLING CUTTERS
● SQUARE BLADES Easily Replaced.
● Simple, Accurate Blade Adjustment.
● Lowest Blade Cost.
● Cutters from 1½" to 14" dia.
PATENTED END MILL
PAT. SHELL MILL
SEND FOR BULLETIN
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182 SIGOURNEY ST., BROOKLYN 31, N. Y.

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CAMS
Fully equipped modern machine shop with extensive **Jig Boring, Surface Grinding, Horizontal Boring** and **Thread Grinding** facilities as well as modern **Cam Milling** and **Cam Grinding** equipment.
Your Inquiries Answered Promptly
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Illustrated—Logansquare Cylinder Meets J.I.C. Standards

Look to Logan

the ultimate in air cylinder design

FREE SEND FOR THE "LOGAN CALCULATOR"

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COMPANY _____

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For more data circle **465** on Reader Service Card

new shop equipment . . .

Gear Shaving Machines and automatically inspects all finish shaved gears, has been developed and built by National Broach and Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The system, which is adaptable to a variety of cluster type gears having two or more gears on a part, utilizes curved inclined feed chutes and motorized vertical chain conveyors that act as intermachine storage devices. Each of the four standard Model GCU Red Ring Gear Shavers is equipped with a Red Ring Rocker Type Automatic Loader. Gears from each shaving machine are fed through washers into motorized Red Ring In-Process Gear Checkers, which automatically inspect the finish shaved gears and reject from the feed chutes any gears that do not meet the gaging requirements.

A typical two gear cluster feeds through the system in the following sequence. Each cluster gear is received in a chute from the previous tooth forming operation and raised by a bucket on a vertical chain conveyor unit to a short chute portion that is pivoted by an air cylinder control. This pivoted chute can direct the gear into either of two chutes, which feed the gears to automatic loaders in a pair of shaving machines that shave the gears on one end of the cluster.

The position of the chute is determined by the individual demands of each of the two shaving machines. If the chute going to one of the machines

FREE

...and full of facts

Send for this aid to better surface grinding

Here's a handy-sized, easy-to-read book that tells you how to know your surface grinding machines and get the best service out of them.

Its 88 pages are illustrated and packed with helpful facts on operating different types of surface grinders, with valuable advice on wheel selection and trouble-shooting. Ask your Norton Distributor for it, or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world. W-1792

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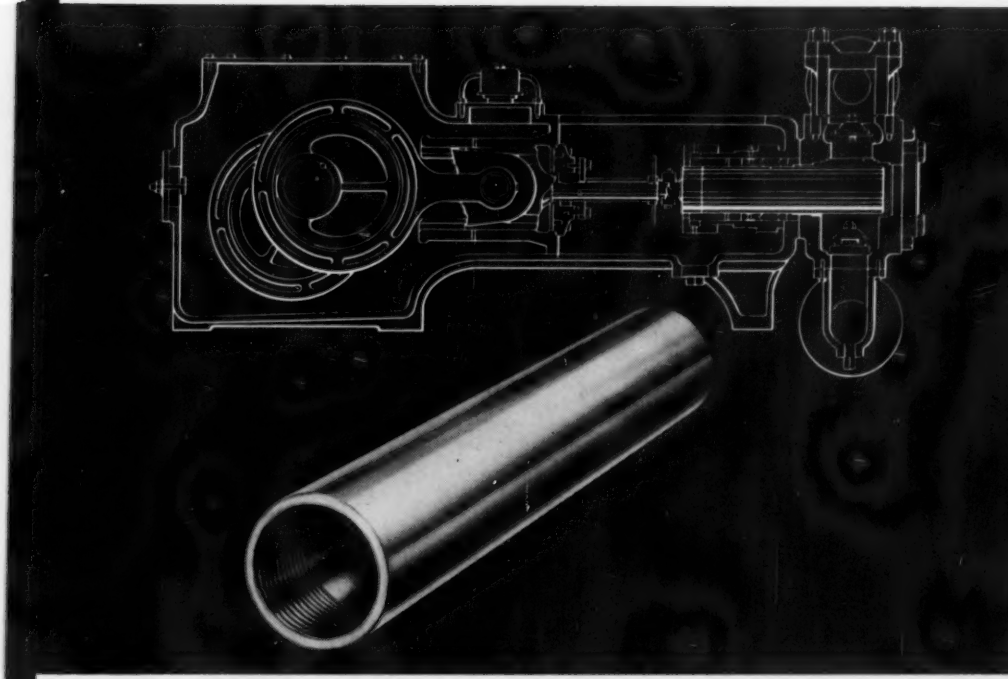


Reducing Costs With Job Matched Tubing

Does a higher grade tube really cost more? Reduced overall manufacturing cost of pump plungers resulted when one maker switched from tubing made from open hearth processed alloy steel to B&W electric-furnace Alloy Steel Tubing. Rejections on a large production run were reduced drastically (10.75% to 1.25%).

The plunger had to have a very good finish and was to be chrome plated. Jobs like this require high quality and "clean" steel. Because of B&W's melting practices and familiarity with making "clean" steels for bearings and other applications, it was suggested to the fabricator that he consider B&W electric-furnace 8620 Steel Tubing. The use of B&W electric-furnace Alloy Steel drastically reduced rejects on the finished part.

Once again Mr. Tubes proved conclusively that final cost—not initial cost—is the measure of good tube fabricating practice. If you're concerned with costs as well as producing a good finished product, get in touch with Mr. Tubes. He can help you save money.

The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W TUBULAR PRODUCTS DIVISION

TA-6100-M5

Seamless and welded tubular products, seamless welding fittings and forged steel flanges — in carbon, alloy and stainless steels.

For more data circle **467** on Reader Service Card

Natco Naturals

Any time your parts require machining *more than one hole*–drill, bore, face or tap–it may well be a "Natco Natural." Your standard Natco will produce

is full, or the other machine is nearly out of gears in front of its loader, the chute is diverted automatically to feed the other machine. The gears are fed one at a time by the loader into shaving position under the rotary shaving cutter where they are automatically positioned, shaved and unloaded into an exit chute.

Finish shaved gears from each machine are passed through individual inclined chutes into the washers and on to automatic motorized gear checkers, where they are meshed with a double pivoted master gear and gaged for size accuracy. Gears that do not pass inspection drop from the chute into a pan situated under the motorized checker.

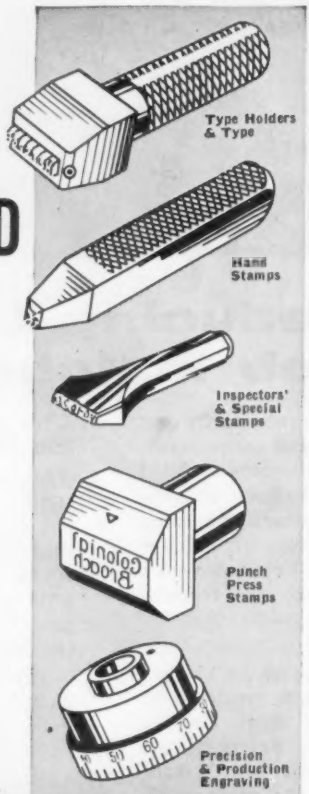
Gears that pass inspection roll around a curve into the buckets on a second vertical chain conveyor and are, thus, turned end for end so that the second gear on the cluster is correctly positioned for its shaving operation.

The gears are fed from the second vertical chain conveyor into another pivoted chute portion that directs the gears through inclined chutes into a second pair of gear shavers in the same manner as they were fed into the first pair of shaving machines. The accuracy of the shaving of the second gear on the cluster is similarly gaged with individual washers and motorized automatic gear checkers in the exit chutes of each shaver. Gears that pass

You'll "mark" savings with NEW METHOD MARKING DEVICES...

- More impressions
- Longer marking life
- Clearer impressions
- Finest tool steel
- Quick delivery

"We solve marking problems." Write our Mr. C.D.K. Brown for catalog and advice.



NMSS SINCE 1931 NEW METHOD STEEL STAMPS INC.
147 JOS. CAMPAU • DETROIT 7, MICH.

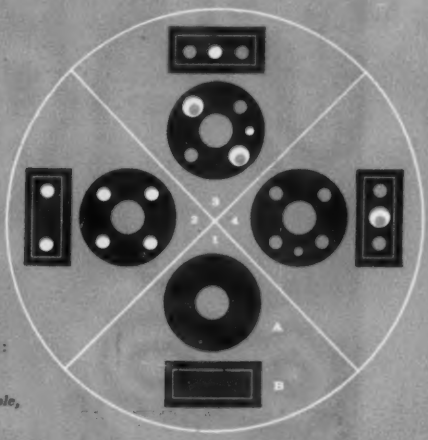
For more data circle 468 on Reader Service Card

Natco Naturals

Cost-Cutting Ways
You Can Use
Standard Multi-Spindle Natcos

Any time your parts require machining *more than one hole*–drill, bore, face or tap–it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

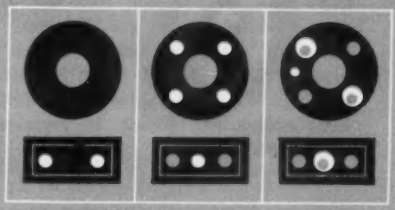
Multiple Drilling Operations on Two Part-faces



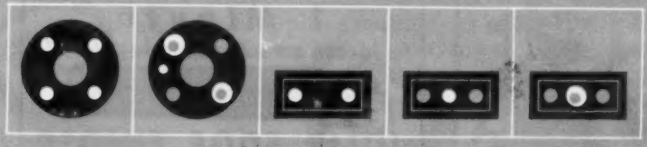
130 parts per hour–4-position rotary table. POSITION #1: *Unload finished part, transfer half-finished part, load new part.* POSITION #2: *Drill 4 holes, Face A. Drill and countersink 2 holes, Face B.* POSITION #3: *Drill 1 hole, ream 2 holes, Face A. Drill 1 hole, Face B.* POSITION #4: *Trepan 1 hole, Face B.*

65 parts per hour–stationary fixture *with 5 work locations. Operator transfers parts after each stroke. One part completed per stroke.*

40 parts per hour–straight-line indexing. *After every 3 strokes, operator unloads finished part, transfers half-finished part and loads fresh part.*



23 parts per hour–tumble-type fixture. *Operator transfers and tumbles fixture from one position to the next. One part completed every five strokes.*



Standard multi-spindle Natcos range from 1 hp, 10-spindle machines to 50 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms of bored slip plates

NATCO

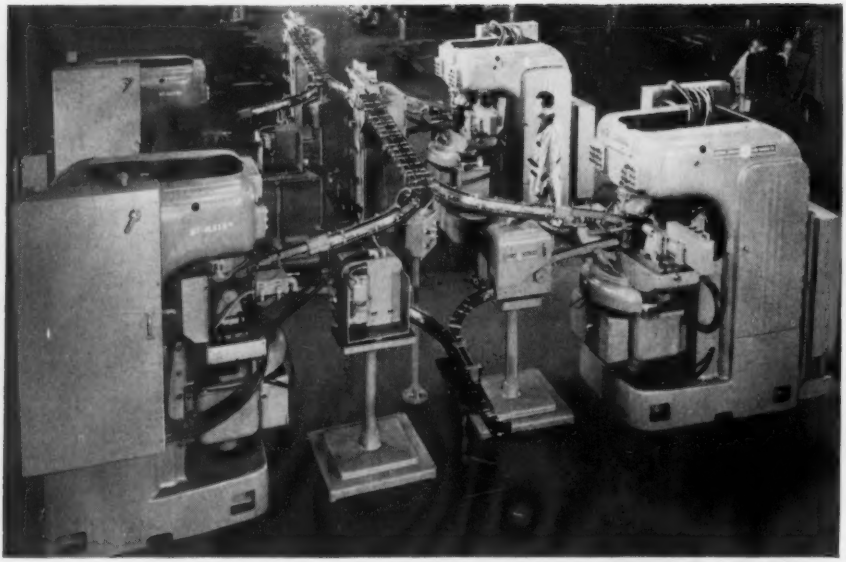
National Automatic Tool Company, Inc.

Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

For more data circle **469** on Reader Service Card



An overall view showing the simplified automation system that completely integrates the feed and control functions of four Red Ring Gear Shaving Machines

inspection roll down another curved chute where they are lowered to a common chute by means of an anti-nicking teeter-totter type mechanism, through which the gears are fed to the next operation which is required in their production.

For more data circle **99** on Reader Service Card

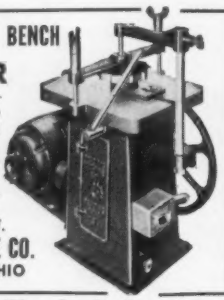
LEAD HAMMER WITH WOOD HANDLE

Podlin Tool Co., 11917 Franklin Ave., Franklin Park, Ill., is now offering lead hammers with wood handles, in addition to its line of lead hammers with tubular steel handles.

READING BENCH KEYSEATER

Portable — move directly to job; a time saver for both small and large shops.
3¾" stroke; adaptable for other work.
Low first cost — prompt delivery.
Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO



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1 Minute
to locate an edge within .0005"!

JUMP EDGE FINDER

PRICE $2.50 Complete satisfaction — or full refund.
Postage free if payment with order.

ELISHA PENNIMAN ELMWOOD 10, CONN.

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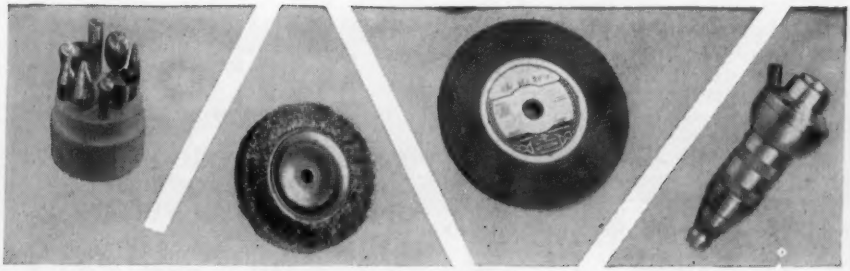
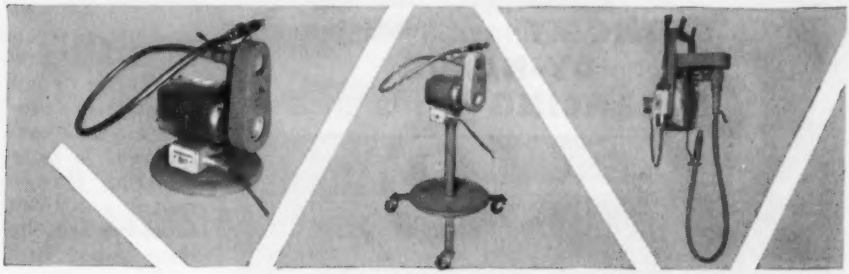
For more data circle 469 on Reader Service Card



everything you need



from start to finish

Remember, when you're checking specifications and selecting equipment, don't fail to consider Haskins flexible shaft machines and accessories. Haskins' complete line of equipment insures faultless performance on your *special* and *standard* metal-working operations —*without interruptions.*

Whether you're grinding, wire-brushing, filing, whatever the job, a start with Haskins will carry you through from the beginning right down to a perfect finish. Our three models, bench, pedestal and suspended mounts, plus a multiplicity of metal-working tools, enable you to achieve faster production, lower labor costs and a superior finished part! Find out about the versatile line of Haskins flexible shaft machines and accessories—*leaders in their field for over 30 years.*

Write Today for a Catalog and Literature

HASKINS

R. G. HASKINS Co.

2647 West Harrison Street Chicago 12, Illinois

For more data circle 472 on Reader Service Card

Podlin Lead Hammer with wood handle

They are available in 1½, 3 and 5 pound sizes and are included in the company's Exchange Service Plan on used Podlin Lead Hammers.

For more data circle **100** on Reader Service Card

★ ★ ★

IMPROVED TOOLROOM SHAPER COMBINES ECONOMY OF OPERATION WITH VERSATILITY

Jersey Manufacturing Co., 442 Livingston St., Elizabeth, N. J., has introduced the Jemco H-20 Universal Toolroom Shaper, which facilitates a wide variety of high precision work, regardless of whether or not surfaces or profiles are to be machined. A pole changing flange motor allows shaping to be done either with a draw or conventional cut. The modern construction of this machine is said to insure smooth and vibrationless operation and the use of high cutting speeds.

The working range of this precision toolroom shaper is 8 by 11⅞ inches. Accuracies of plus or minus 0.00025 area are guaranteed within the working limits of the machine. By simple switch control, the strokes can be changed

"Bear Dy-Namic Balancing meets our requirements at reasonable cost, with utmost simplicity of operation," says Russell Hogin, Mfg. Div. Staff Asst., Goss Printing Press Co., where this Bear #400R Machine is used to balance plate, impression and folding cylinders, and ink drums.

There's little room for "play" or vibration between rollers and cylinders on today's high-speed presses. It takes close-tolerance manufacture and top-quality control . . . without losing sight of production costs! That's why Bear Dy-Namic Balancing is a regular part of production at precision-conscious firms. Whether your problem is to cut down vibration, noise or bearing wear Bear will improve your product, too.

FREE DY-NAMIC BALANCING CATALOG sent without obligation. Bear Mfg. Co., Dept. M-25, Rock Island, Illinois.

106

BEAR
STATIC AND DY-NAMIC BALANCING MACHINES

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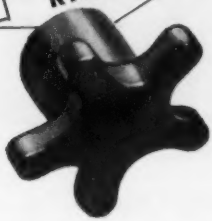
MACHINE PRODUCTS

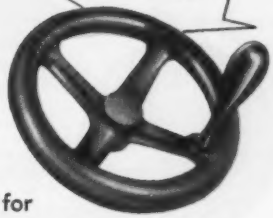
Your Complete Line Source for . . .

KNOBS



LEVERS

WHEELS & HANDLES



Cadmium plated and ready for
immediate delivery in the style, size and quantity of your choice.

PRECISION SURFACES & ACCESSORIES

SURFACE AND LAYOUT PLATES
ANGLES • VEE BLOCKS
STRAIGHT EDGES
CYLINDER SQUARES
PARALLELS • CUBES
ALUMINUM ANGLES
ALUMINUM HEIGHT BLOCKS
ADJUSTABLE ANGLE PLATES

Free! Complete line catalog . . . send for your copy today!

MACHINE PRODUCTS *Corporation*

6771 E. McNICHOLS ROAD • DETROIT 12, MICHIGAN

For more data circle **474** on Reader Service Card

new shop equipment . . .

to either 60 or 120 strokes per minute.

The Jemco H-20 is equipped with a dividing head with tailstock, a swivel vise, a 12¼ by 12¼ inch table with suitable locking jaws, two toolholding fixtures—one for forward cutting and one for draw cutting — and a work table which can be swivelled to any angular position, according to a graduated scale. This swivel table can be locked in three main working positions and is provided with fitted in clamping devices which eliminate exchanging and resetting work.

Jemco H-20 Universal Toolroom Shaper

For more data circle **101** on Reader Service Card

DRILL and PILOT BUSHINGS
Frictionless —Rotary
For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. *Write for details.*

GATCO ROTARY BUSHING CO.
42330 Ann Arbor Road, Plymouth, Michigan

For more data circle **475** on Reader Service Card

★ ★ ★

HIGH-SPEED END MILLS

High-speed end mills that give unusual cutting mileage, economy, production and accuracy have been added to its line of tools by Chicago-Latrobe, 419 West Ontario St, Chicago 10, Ill. Sharp corners have been eliminated, which make the tool stronger, and the flutes are so designed that chips move out freely. These end mills

GRANT RIVETERS

• Pioneers in the riveting field. Head rivets from smallest to ¾" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. *Write for literature—and don't forget to send samples.*

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

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CENTERLESS GRINDING

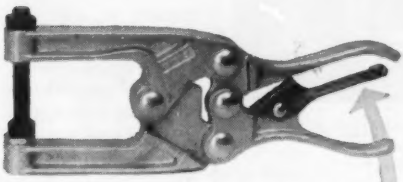
Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle **477** on Reader Service Card

KNU-VISE insta-release PLIERS:

easy to open—quick to re-clamp

insta-release —that's the name for the easy-action release-lever Knu-Vise pliers. Pliers open instantly; re-clamp quickly—easily—without waste motion.



Maintains control over the free-swinging handle—permitting re-clamping with the same grip. Always remains within the hand span of the user.

Flip it over and you have instant release in the other direction. The Knu-Vise *insta-release* lever is available on P-1200 and P-1800 Series pliers.

Remember: Every model of the more than 150 *Knu-Vise* clamps is quick to lock—and quick to open. Ask for a demonstration.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

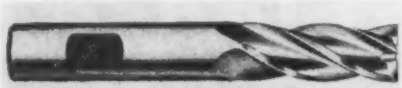
KNU-VISE PRODUCTS **LAPEER MANUFACTURING CO.**

3048 DAVISON ROAD • **LAPEER, MICHIGAN**

WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

For more data circle **478** on Reader Service Card

new shop equipment . . .



View of Chicago-Latrobe High-Speed End Mill

are available in a complete range of styles and sizes.

For more data circle 102 on Reader Service Card

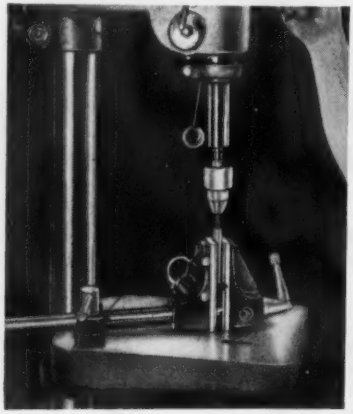
MOTORIZED HARDNESS TESTERS MAKE REGULAR AND SUPERFICIAL TESTS

Two Kentrall Motorized Combination Hardness Testers have been announced by The Torsion Balance Co., Clifton, N. J. Available as standard models in both the 8 and 12 inch vertical capacity, these latest additions to the Kentrall line are said to reduce operator fatigue by motorization of the major load. As a result, production can often be increased from 10 to 20 per cent, depending upon the particuiar piece being handled.

These Kentralls are also effective for laboratory work where only a few tests per hour are made. The advantage is greater standardization of test results because the "human element" has been eliminated from the application and removal of the major load. This part of the test cycle is particularly critical because here the operator's technique has its greatest influence on test results.

Load flexibility is another feature of these combination testers. Either of these machines can make tests on all Rockwell Regular and Superficial

You need both on your drill press



Step Up Production with Two AMF Tools

The AMF *Wahlstrom Chuck* will help change tools in seconds, safely. The *fully-automatic* Wahlstrom makes it possible to drill, ream, counterbore with *one spindle* and without moving work. No keys, collets or wrenches.

The AMF *Float-Lock Vise* turns a drill press into a complete machine tool. Easy to mount—in minutes. Horizontal and vertical "V" grooves align and grip rounds securely for end drilling and centering. Many other uses on every set-up.

Write for details and name of nearest distributor.

AMF Tool Division
AMERICAN MACHINE & FOUNDRY COMPANY
224 Glenwood Avenue, Bloomfield, N. J.

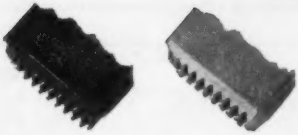
For more data circle 479 on Reader Service Card

V-B Liquid Honing*

Your Way to Say:

"MOST MODERN PRODUCTION BLASTING EVER DEVELOPED!"

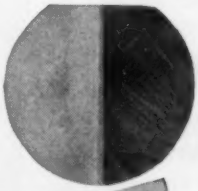
This Machine Should Be Processing Your Parts



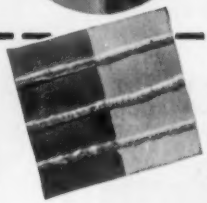
Vapor Blast Liquid Honing removes heat treat scale faster than conventional tumbling or any other process, and without pitting the steel.

DOLLAR FOR DOLLAR, JOB FOR JOB, NO OTHER SURFACE-CONDITIONING METHOD CAN EQUAL LIQUID HONING.

Metals, plastics, ceramics — any materials you use — can be Liquid Honed fast and to close tolerance. Send a sample scale-covered part with a letter describing your problem. Liquid Honing engineers will remove the scale and return the part with their recommendations. No cost to you...no obligation.



Vapor Blast Liquid Honing blends out grind lines, as shown in the area to the left. The smooth, non-directional surface is ideal for oil flow and unequalled lubrication. Liquid-abrasive action also hones down tiny burrs along edges of parts like this one.



This unretouched photo of three weld seams shows how efficiently you can remove mill scale, rust, welding and heat discoloration. Top weld is stainless steel; next, copper brazing; bottom, common steel.

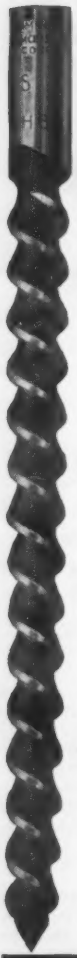
VAPOR V-B BLAST MILWAUKEE, WISCONSIN

VAPOR BLAST MFG. CO.
3013 WEST ATKINSON AVENUE
MILWAUKEE 16, WISCONSIN

"Vapor Blast" and "Liquid Honing" are trademarks

For more data circle 480 on Reader Service Card

4 Reasons why you should use GAMMONS DIE REAMERS



Specially treated for today's modern die steels.

Rapid cutting capacity.

Tapers per inch .005 —.008, —.013 in stock.

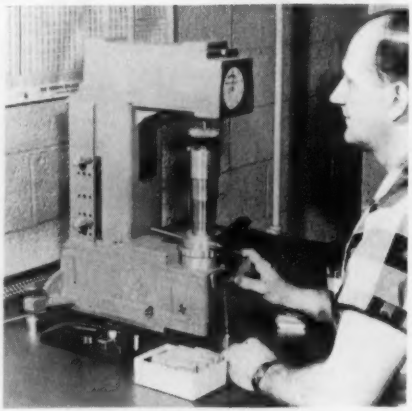
Large range of standard sizes in stock at all times for your convenience.

WRITE FOR COMPLETE INFORMATION

GAMMONS • HOAGLUND CO.
MANCHESTER 2, CONN.
Manufacturers of helical taper pins, chucking, die makers and special reamers.

For more data circle **481** on Reader Service Card

new shop equipment . . .



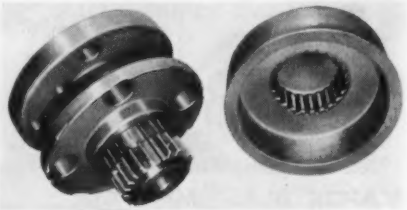
Kentrall Motorized Hardness Tester in use

scales. These motorized Kentralls are also available on special order in 4 and 16 inch vertical capacity.
For more data circle **103** on Reader Service Card

★ ★ ★

SPLINE ARBOR

The N. A. Woodworth Co., 1300 East Nine Mile Rd., Detroit 20, Mich., has announced another application of its Tork-Lok Arbor. Supplied with an interchangeable collet for splined parts, this application is for grinding the o.d. and flanged face true to the pitch diameter of a coupling housing.



N. A. Woodworth Tork-Lok Spline Arbor

Three ways Multipress® boosts profits

1

Better quality. Rejects have been virtually eliminated for this toy manufacturer. Easily broken plastics and intricate electrical relays are assembled quickly, accurately with Multipress.

2

Lower costs. Specialty manufacturer reduced cost of pepper mill assembly from 15¢ to 4¢ per unit by using Multipress equipped with simple interchangeable tooling.

3

Adapts to any job. Special tooling on this 4-ton Multipress made it possible to mass-produce the point for a cartridge-filled pen. Blanking, piercing and stamping are performed with one Multipress ram stroke.

Let Multipress point the way to production economy

DENISON Hydr Oil ics

For complete information, write:

DENISON ENGINEERING DIVISION

American Brake Shoe Co.

1220 Dublin Road, Columbus 16, Ohio

HYDRAULIC PRESSES, PUMPS, MOTORS, CONTROLS

For more data circle **482** on Reader Service Card

new shop equipment . . .

The collet locates on the pitch diameter of the spline, assuring concentricity of 0.0005 t.i.r. in the machining of this part.

According to the manufacturer, this is but one of the several special applications that this relatively new tool can accomplish.

For more data circle **104** on Reader Service Card

LINE OF METAL CUTTING BAND SAWS

Heller Tool Co., Newcomertown, Ohio, recently announced the introduction of a complete line of Job Tempered Metal Cutting Band Saws. The complete line includes both hard edge standard steel and high-speed steel saws. Standard Tooth shape is provided for cutting most ferrous and hard, non-ferrous materials. Skip Tooth blades are furnished for cutting soft metals such as copper and aluminum, as well as wood, plywood, composition board and plastics. Hook Tooth saws, designed for faster cutting especially in gummy materials, are also included in the line.

Blade widths range from ⅛ to 1 inch. Standard Tooth blades are furnished with either regular or wavy set teeth. Skip and Hook Tooth blades are regular set only. All saws are heat treated for hardness along the toothed edge only providing maximum wear resistance for the teeth, leaving the remainder of the blade flexible to withstand the constant bending over the wheels in operation.

Amazingly
COOL
HEAT
VENTILATED
REFLECTOR

NEW
MODEL 55-VCX-701
FOSTORIA
LOCALITE

FINEST OF ALL
LOCAL LIGHTING UNITS

$9.31 EACH
In Std. Pkg. of 4

MARVELOUS NEW
SEEING TOOL
Frictional arm and collar disc joints give flexibility of a thousand positions to direct light exactly as wanted. Rugged construction with heavy duty industrial socket, Levolier switch and universal base.

INNER SHIELD
ACCESSORY
for extreme coolness when using 100 WATT lamps.

WRITE for complete catalog of Localite Models for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION, FOSTORIA, OHIO
Localites are available through wholesalers everywhere

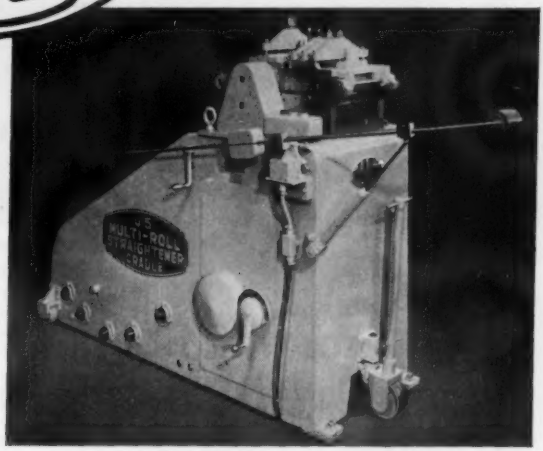
LOCALITE fostoria For Light ON the Job

For more data circle **483** on Reader Service Card

USE U.S. PRODUCTS ★

REDUCE PRESS-ROOM COSTS

Model PDSC-940 (Portable) Capacity: Material up to 9" wide x 1/8" thick. Coils with O.D. up to 40". Also made in other sizes.



★ U. S. PRODUCTS

Slide Feeds
Roll Feeds
Stock Straighteners
Stock Reels
Stock Oilers
Coil Cradles
Wire Straighteners
Die Sets
Multi-Slides®
Multi-Millers®

Don't allow inefficient operations to devour your profit margin. U. S. Automatic Pressroom Equipment is designed and built *to help you effect savings* in the production of stampings.

The use of coil stock in press operations generally results in the need for a Straightener and a Coil Holder. On operations of this type you can improve efficiency, and at the same time conserve valuable floor space by using a U. S. Combination Coil Cradle and Power-Driven Straightener of the type illustrated above.

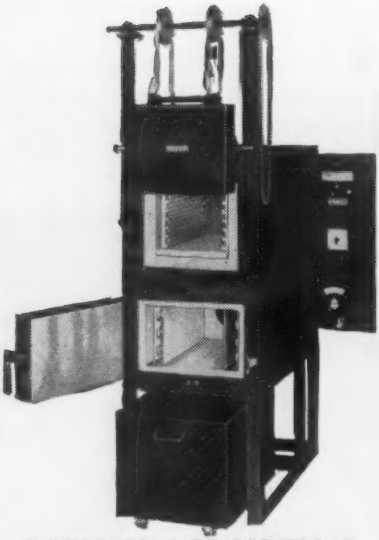
Your inquiries are invited. Ask for Bulletin 100-S.

U.S. TOOL COMPANY, INC.

AMPERE (East Orange) NEW JERSEY

For more data circle **484** on Reader Service Card

wholesalers everywhere
For more data circle 483 on Reader Service Card



SAVE SPACE WITH A
SERIES 8055
COMBINATION MODEL

Two independent furnaces (hardening and drawing) in the same floor space one requires. Complete with independent controls. Hardening furnace available in both a 2000° and a 2300° F. range.

Drawing furnace has a maximum of 800° F.* Quench tank included with the exception of the largest standard model.

Chamber Size H.	W.	L.	Prices 2000° F.	2300° F.
6"	6"	12"	$ 865.00	$ 975.00
9"	9"	18"	1325.00	1450.00
12"	12"	24"	1850.00	1950.00
18"	18"	36"	2750.00	2875.00

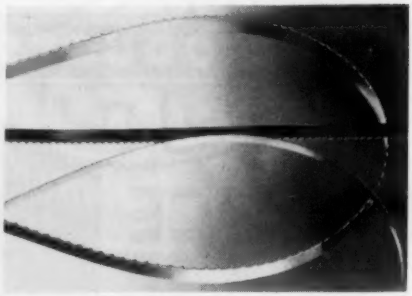
* Also available up to 1250° F.

WRITE FOR FREE LITERATURE, SPECIFICATIONS and price list of Lucifer Furnaces in wide range of sizes —top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

LUCIFER
FURNACES, INC.
NESHAMINY 6, PA.
Phone Osborne 5-0411

For more data circle 485 on Reader Service Card

new shop equipment . . .



Heller Metal Cutting Band Saw Blades

Blades are packaged in 100 and 250 foot coil lengths, or cut-to-length and welded to fit specific machines.

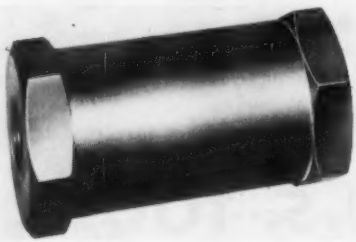
For more data circle 105 on Reader Service Card

★ ★ ★

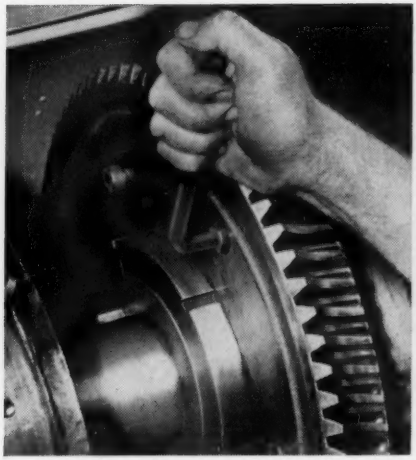
LIGHTWEIGHT CHECK VALVE

Ross Operating Valve Co., 139 East Golden Gate Ave., Detroit 3, Mich., recently announced that an aluminum check valve, weighing but four ounces, has been added to its line of equipment products. The manufacturer states that the valve is simply constructed, with a poppet as the only moving part.

Available in two models, ½ and ⅜ inch pipe size, the check valve has a differential cracking pressure of 1



Ross Lightweight Aluminum Check Valve



The ordinary fasteners securing the worm wheel to the drum shaft in this screw machine loosened, causing $120 worth of damage. Labor for the repair cost $100. The fasteners were replaced with self-locking UNBRAKOs, which eliminated the trouble.

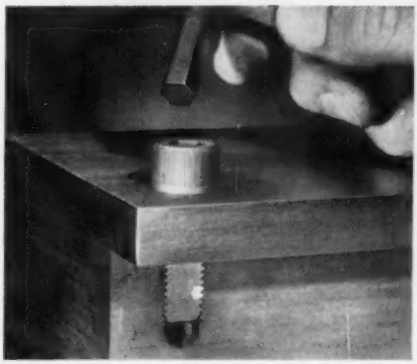
Vibration won't loosen self-locking UNBRAKO socket cap screws

UNBRAKO socket screws with the Nylok* self-locking device eliminate fastener problems caused by vibration.

Take the drive system in the automatic screw machine illustrated above, for example. The screws originally used to secure the worm wheel to the drum shaft loosened, causing considerable damage, besides loss of production time. These have now been replaced with self-locking UNBRAKO socket head cap screws and the trouble has been eliminated.

An UNBRAKO socket screw with the Nylok self-locking device is a single unit. Just screw it into any tapped hole. Seated or not, it locks positively wherever wrenching stops. Constant vibration or endless running of a machine won't affect these self-locking UNBRAKOS. The screws will not work loose!

Write today for your copy of Form 2193, which gives catalog and technical data on the complete line of UNBRAKO socket screws with the Nylok self-locking device. Or see your local industrial distributor. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.



HOW IT LOCKS. The tough, resilient Nylok locking pellet keys itself into the mating threads. It forces threads together and locks the screw securely—whether or not the screw is seated.

STANDARD PRESSED STEEL CO.
UNBRAKO SOCKET SCREW DIVISION
SPS
Jenkintown Pennsylvania
*T.M. REG. U.S. PAT. OFF., THE NYLOK CORP.

Phone Osborne 5-0411 | Ross Lightweight Aluminum Check Valve
For more data circle 485 on Reader Service Card

new shop equipment . . .

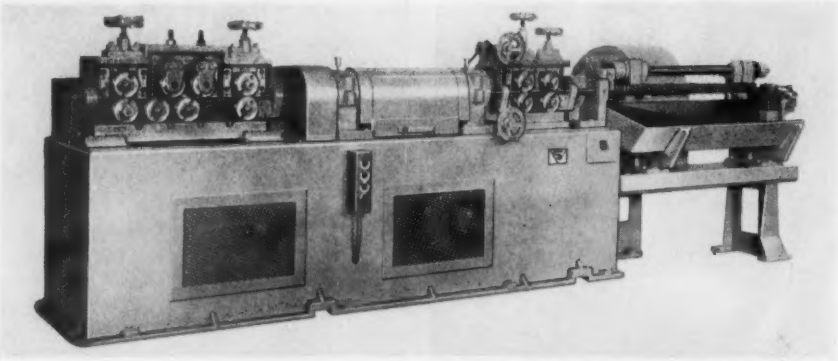


Illustration showing Shuster Electrified Wire Straightening and Cutting Machine

p.s.i. maximum. Differential sealing pressure is less than 1 p.s.i. The lightweight unit is said to withstand operating pressures of up to 125 p.s.i.g. and temperatures up to 175 degrees Fahrenheit.

For more data circle **106** on Reader Service Card

★ ★ ★

WIRE STRAIGHTENING AND CUTTING MACHINE IS ELECTRIFIED

Mettler Machine Tool, Inc., 157 Adeline St., New Haven, Conn., recently announced that its Shuster 3AV and 4AV Wire Straightening and Cutting Machines are now completely electrified. The 3AV, with a capacity of ¼ to ½ inch basic wire, and its big brother the 4AV, from ⅜ to 11/16 inch, each include as original equipment two Reeves Variable Speed Transmissions, controlling infinite speed of feed and speed of cut; Micro-Switch target, electrically activating the roll type clutch and automatic cut-off; solenoid clutch control; and Warner Electric Brake on the clutch shaft. The 3AV feeds up to 220 feet per minute, and the Model 4AV has a feed range of from 90 to 180 feet per minute.

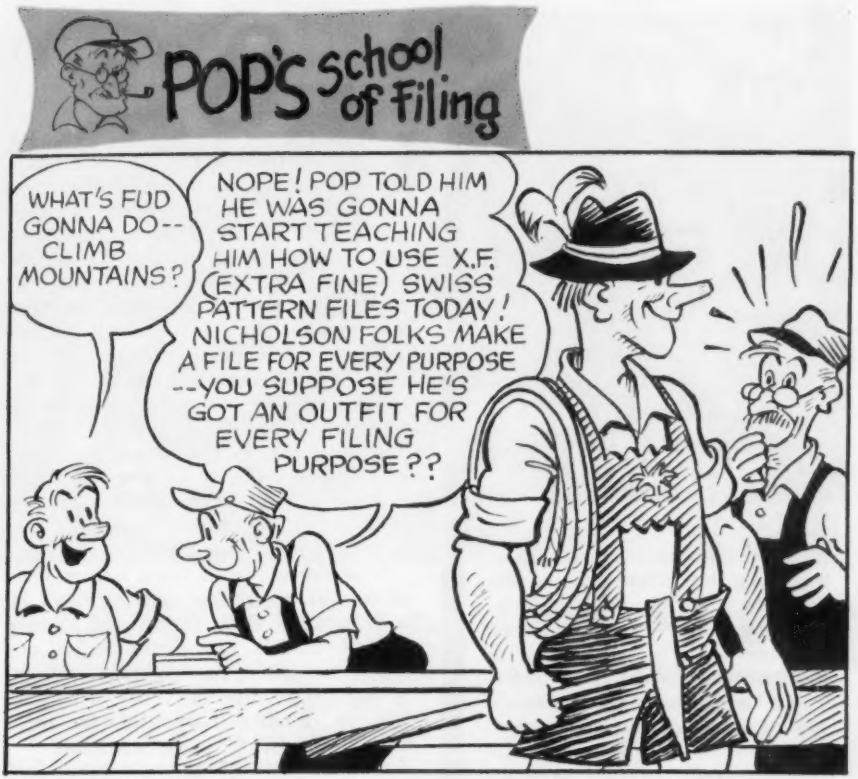
For more data circle **107** on Reader Service Card

★ ★ ★

MOTORIZED RAM ADJUSTMENT ON PRESS SPEEDS TOOLING CHANGES

Verson Allsteel Press Co., 9310 South Kenwood Ave., Chicago 19, Ill., has announced that a motorized ram adjustment is now available as optional equipment on all of its open back inclinable presses. This ram adjustment is said to offer particular advantages to short run press working. When frequent changes of tooling are necessary, one press with multiple die sets can accommodate the forming requirements of a group of components. Through utilization of Verson O.B.I. Presses with the motorized ram adjustment, tooling changes can be speedily accomplished.

A one-half to one horsepower electric motor, depending on the size of


POP'S school of filing
WHAT'S FUD GONNA DO-- CLIMB MOUNTAINS?
NOPE! POP TOLD HIM HE WAS GONNA START TEACHING HIM HOW TO USE X.F. (EXTRA FINE) SWISS PATTERN FILES TODAY! NICHOLSON FOLKS MAKE A FILE FOR EVERY PURPOSE --YOU SUPPOSE HE'S GOT AN OUTFIT FOR EVERY FILING PURPOSE??

For precision filing and fine work, Fud can forget the leather outfit – and simply equip himself with the proper Nicholson X.F. Swiss Pattern files.

These precision files are made to extremely tight tolerances. And Nicholson makes hundreds of types so that anyone who needs a Swiss Pattern file can get the type he needs with Nicholson quality.

Nicholson X.F. Swiss Pattern files have the same general shapes as American Pattern files, but you will find them thinner and more finely shaped. You can get Nicholson X.F. Swiss Pattern files in seven degrees of fineness, instead of the usual three for American Pattern files.

Try Nicholson X.F. Swiss Pattern files in your shop. You'll enjoy using them.

NICHOLSON U.S.A.

NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

BLACK DIAMOND U.S.A.

NICHOLSON FILES A FILE FOR EVERY PURPOSE

Warner Electric Brake on the clutch

PRODUCTION
Tripled
TOOL COST
Halved
with W&S
COMBINATION TOOL

A home appliance manufacturer was using four screw-machine stations for centering, drilling, counterboring and reaming for brass components. To increase output of the machines, Woodruff & Stokes was asked to design a combination tool to center, drill, counterbore and ream *in one operation*. The resulting tool cost half as much as the four tools it replaced, cut production time by two-thirds, by making double indexing possible.

Chances are, a tool designed by W & S small tool specialists can streamline your own production. Our tool specification sheet makes it easy for you to find out.

WOODRUFF & STOKES CO.
INCORPORATED
Bldg. 32, 353 Lincoln St.,
Hingham, Massachusetts

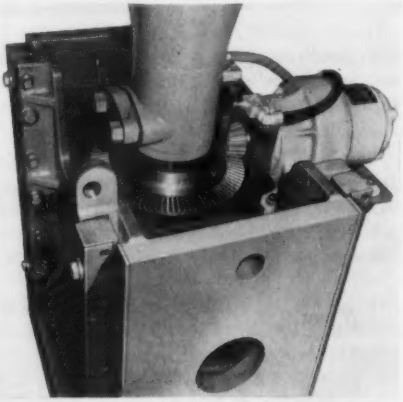
For more data circle 488 on Reader Service Card

new shop equipment . . .

the press, is mounted directly on the press ram. Up-down lock type control buttons, mounted at the operator's station, actuate the motor. A pinion gear, mounted on the motor shaft, revolves the adjusting screw through the bevel gear, machined as part of the screw. The adjusting screw is threaded in the pitman and connected to the ram, thus moving the ram up or down, depending upon the direction of the travel of the screw. A clamping cap on the pitman secures the adjusting screw at the desired position. Thus, the press ram can be quickly adjusted when changing from one die set to another. Safety limit switches can be installed, if desired, to prevent excessive travel.

The Verson Open Back line is complete with capacities ranging from 90 to 215 tons. Both single and double geared models are available as upright, inclinable, permanently inclined or horn type. Special types of presses can be readily fabricated to meet special needs.

For more data circle 108 on Reader Service Card



Verson Motorized Ram Adjustment on press

WILSON "ROCKWELL"—
THE WORLD'S STANDARD OF HARDNESS TESTING ACCURACY

WILSON "ROCKWELL"
HARDNESS TESTERS

A FULL WILSON LINE TO MEET EVERY HARDNESS TESTING REQUIREMENT

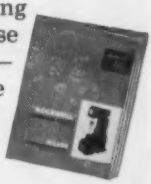
FULLY AUTOMATIC
•
SEMI-AUTOMATIC
•
REGULAR
•
SPECIAL
•
SUPERFICIAL
•
MICRO & MACRO HARDNESS TESTERS

For easy, accurate production tests

Sensitive and Accurate as a precision balance—the WILSON "Rockwell" hardness tester insures the quality of your products and protects your good name as a manufacturer.

Durable as a machine tool—WILSON "Rockwell" hardness testers withstand severe daily use with a minimum of service requirements.

A staff of WILSON hardness testing experts is available to help choose the model best suited to your job—and provide quick emergency service if it is ever needed.



Write for booklet DH-325 today

ACCO for Better Values

Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

ACCO

230-G Park Avenue, New York 17, N. Y.

Hingham, Massachusetts

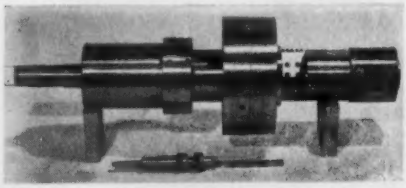
For more data circle 488 on Reader Service Card

Verson Motorized Ram Adjustment on press

new shop equipment . . .

TOOLING DEVELOPMENT FOR MACHINING ATOMIC REACTORS

Maxwell Industries, Inc., Macedonia, Ohio, recently announced a tooling development for machining the Breech Block mechanism in atomic reactors. The complete tooling consists of a recessing tool, which machines the internal annular grooves and, a milling attachment, which mills the longitudinal slots in such a way as to receive the male Breech mechanism.



View showing Maxwell Recessing Tools

Both tools have been designed for use in radial drills, boring mills, milling machines and so on. This development is claimed to have reduced the time consumed in performing these operations. Although these tools were designed primarily for use in manufacturing atomic recators, they may be applied to any large workpiece requiring internal forming and milling operations.

The accompanying illustration shows only the recessing tool, the size of which can be judged by the standard recessing tool, also shown.

For more data circle 109 on Reader Service Card

Unique design of the two-dimensional Model D-2 features—Single micrometer adjustment controls vertical depth of cut, and adjusts height of copy table and pantograph.

Range of ratios from 2 to 1 to infinity!

Accessibility on three sides permitting panels up to 30" diameter to be engraved, milled or profiled. Vertical range over 10" allowing operations on complete chassis, cabinets or other bulky objects.

Ruggedness, stability and precise accuracy inherent in construction.

Mounted on the ruggedly constructed heavy duty steel Green Engraver Bench. All functional parts are conveniently within reach of the operator while seated. Accessibility of master type sets stored in lower cabinet trays, tools and accessories contribute to productive capacity.

A brochure with full details is yours upon request.

Literature also available on the smaller Model 106 three-dimensional engraver.

GREEN INSTRUMENT COMPANY

397 Putnam Ave., Cambridge, Mass.

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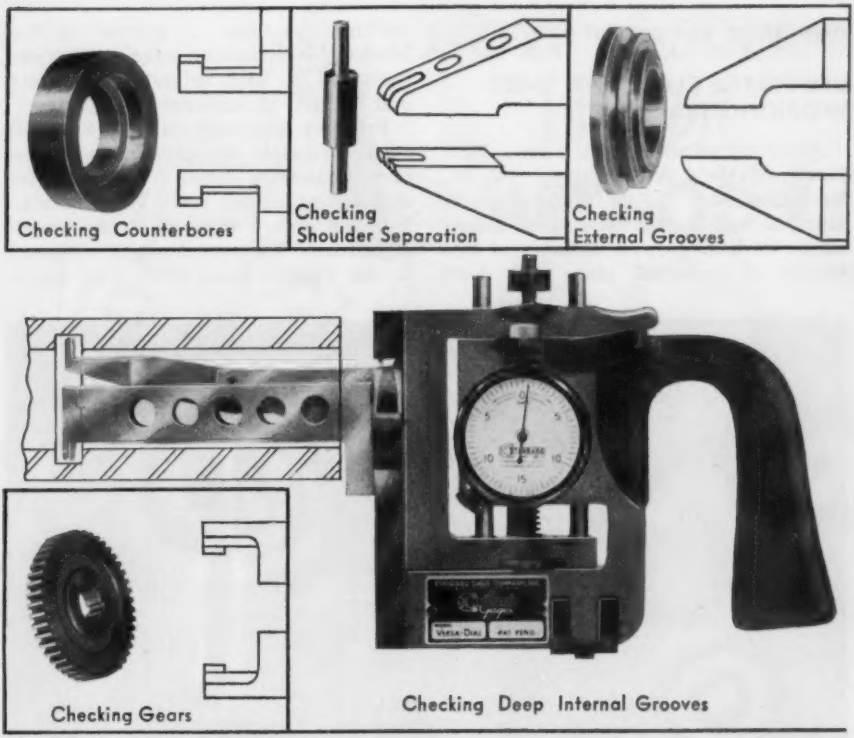

VERSA-DIAL® the only true all purpose Dial Gage

EASY TO OPERATE, easy to read, this multi-purpose dial gage measures *internal and external* dimensions . . . . quickly and accurately.

VERSA-DIAL can be switched from one type of work to another in seconds — all you have to do is change the jaws. Light weight, compact, it is exactly what its name implies . . . *versatile* . . . at inspection bench or machine. Ask the *Man-from-Standard* or write Standard Gage Company, Inc., for full information.

STANDARD® Gages POUGHKEEPSIE, N. Y.

A COMPLETE LINE OF GAGES . . . INDICATING, FIXED AND ADJUSTABLE LIMIT TYPES

GREEN INSTRUMENT COMPANY
397 Putnam Ave., Cambridge, Mass.
For more data circle 490 on Reader Service Card

shown.

For more data circle 109 on Reader Service Card

new shop equipment . . .

UNIVERSAL PLATE AND SHEET WORKING MACHINE

American Pullmax Co., Inc., 2455 North Sheffield Ave., Chicago 14, Ill., has announced the addition of a new machine with increased cutting capacity to its line. Newest member of this family of universal plate and sheet working machines is known as the Model P-9. It has an edge cutting capacity of ⅜ inch in mild steel plate and ¼ inch in stainless steel plate.

Pullmax machines cut and form all types of metals and plastics by means of a stationary lower tool and a reciprocating upper tool. The Pullmax P-9 has a new type of stroke length adjustment to permit eight different stroke lengths from 0.080 inch up to

WILSON "ROCKWELL"—
THE WORLD'S STANDARD OF HARDNESS TESTING ACCURACY

WILSON "ROCKWELL"
DIAMOND

"BRALE" PENETRATORS

A FULL WILSON LINE
TO MEET EVERY HARDNESS
TESTING REQUIREMENT

FULLY AUTOMATIC
•
SEMI-AUTOMATIC
•
REGULAR
•
SPECIAL
•
SUPERFICIAL
•
TUKON MICRO & MACRO
HARDNESS TESTERS

With WILSON Diamond "BRALE" Penetrators the accuracy built into your "ROCKWELL" hardness tester is not jeopardized. Thus, there is no danger of your rejecting good parts, passing sub-standard parts or endangering your good name with your customers. Inaccurate measurements with less expensive, inferior quality diamond penetrators are a hazard you cannot afford.

WILSON "ROCKWELL" Hardness testers—with WILSON Diamond "BRALE" Penetrators, carefully selected and scientifically ground with painstaking accuracy, combine to insure perfect Rockwell hardness testing every time.

ACCO for Better Values

Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

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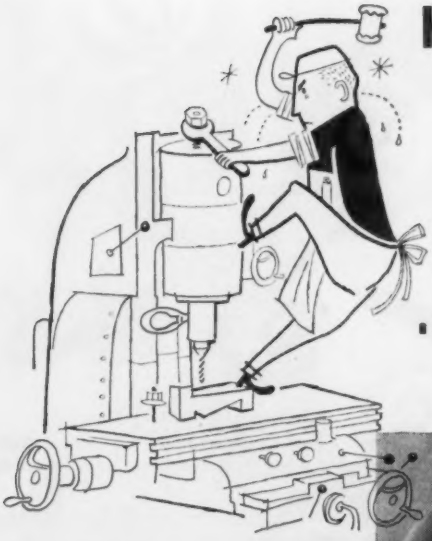
A COMPLETE LINE OF GAGES . . . INDICATING, FIXED AND ADJUSTABLE LIMIT TYPES

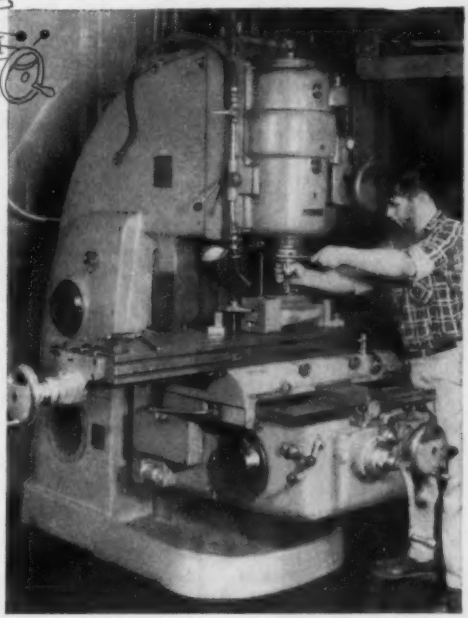
For more data circle **491** on Reader Service Card



HOW MODERN IS *YOUR* METHOD?

...THIS

... or *THIS*



The modern P.D.Q. tooling method completely eliminates the time lost in changing old fashioned type tools. No more "sweating out" loosening and tightening the draw bolt. A 60° turn of the lock nut and you're ready for another tool. P.D.Q. tool changes are only a matter of *seconds* . . . and tools are available in very small, small, medium and large series depending on the application. Write for literature covering all the advantages of modern, cost cutting P.D.Q. (Portage Double Quick) tooling.

REPRESENTATIVES IN PRINCIPAL CITIES

PORTAGE Double-Quick TOOL CO.

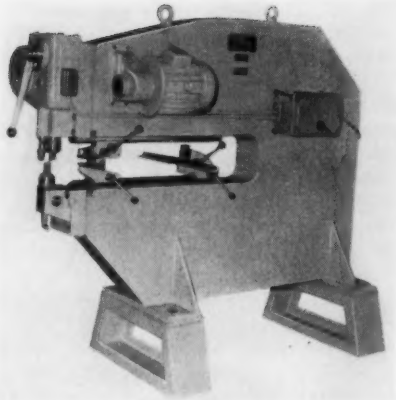
1041 SWEITZER AVENUE • AKRON 11, OHIO

For more data circle **493** on Reader Service Card

0.320. Its 4 h.p. motor operates at two different speeds and can be adjusted to operate at 500, 1,000 and 2,000 strokes per minute.

This variation in speed, combined with the eight different stroke lengths, adds versatility to the operation of the Pullmax machine that is said to give improved quality to the work with a more efficient operation. The P-9 is capable of straight, circle and irregular shearing operations in addition to slot cutting, beading, joggling, dishing, edge bending and flanging.

Straight cutting guides and circle cutting centers feature quick locking devices for instantaneous changes in dimensions. The P-9 is available with the Pullmax power feed device and outside centering attachments, which are said to enable the operator to cut circles of unlimited diameter in the heaviest gauge.



American Pullmax Model P-9 Heavy-Duty Universal Plate and Sheet Working Machine

For more data circle **110** on Reader Service Card

★ ★ ★ ★ ★

Greenerd
PRESSES
ARBOR & HYDRAULIC
for . . .
• ASSEMBLING
• BROACHING
• FORMING
• STRAIGTENING
Rack and Pinion Arbor Presses. Hydraulic presses made to conform to J.I.C. standards. Pictured at right is 15-ton hydraulic press.
GREENERD
LISTED IN SWEET'S MACHINE TOOL CAT.
OR WRITE TODAY FOR CATALOG #554.
Greenerd ARBOR PRESS CO.
41 CROWN ST. NASHUA, N.H.

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BAY
STATE
PRECISION
PERFORMANCE...
To the high diver, precision performance means the graceful and faultless execution of even the most difficult, intricate dives.
To tap users, precision performance means production-line continuity, better threaded parts, increased tap life . . . and BAY STATE!
BAY STATE TAPS
Bay State Tap & Die Company
Mansfield, Massachusetts
On the nearby shelves of your Industrial Supply Distributor

new shop equipment . . .

SUBMERGED TYPE CENTRIFUGAL PUMP

The Brown and Sharpe Manufacturing Co., Providence 1, R. I., has announced a vertical submerged type centrifugal pump called the "Midget Hi-Flow." The pump is equipped with an integral ⅛ h.p., three phase or 1/10 h.p., single phase motor. The motor is totally enclosed with a N.E.M.A. standard flat face mounting and has been designed for continuous duty.

The unit has been designed for immersion in liquid to a depth of 5¾ inches with the motor mounted 2 inches above the maximum liquid level. The liquid flows from the impeller through two cored passages within the pump body, with a ½ inch pipe connection above the mounting flange.

This pump is said to be suitable for supplying coolant for machine tools and light machinery, for use where dirt or abrasives may be present in the liquid and also for light transfer work.

For more data circle 111 on Reader Service Card

The B and S "Midget Hi-Flow" Pump

how to trap dust

that damages your machines and hurts company morale

Easy-to-move

TORIT

dust collectors trap dust at its source!

Untrapped dust costs money: "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-building) system. Torit unit operates only when machine or combination of machines it protects are on. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

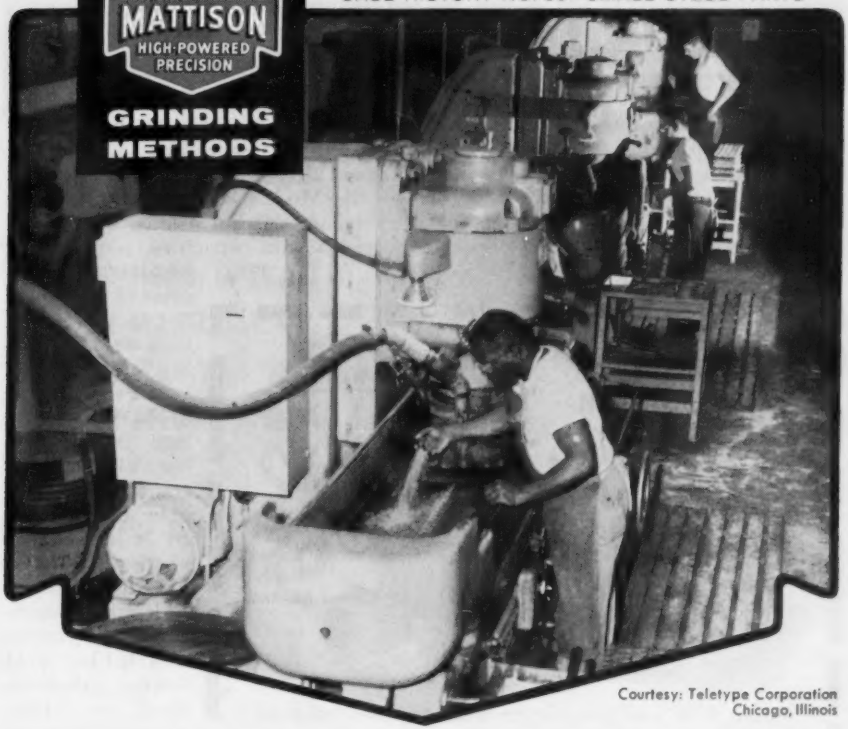
TORIT manufacturing co.

Dept. 701, 296 Walnut Street, St. Paul 2, Minn.

For more data circle 496 on Reader Service Card

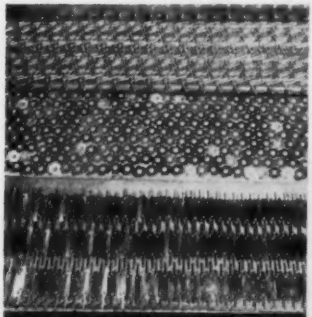
CASE HISTORY NO. 39—SMALL STEEL PARTS

MATTISON
HIGH-POWERED PRECISION
GRINDING METHODS



Courtesy: Teletype Corporation
Chicago, Illinois

Grease-board loading, high-powered surface grinders speed production of precision small parts

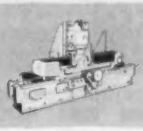


Parts loaded on grease-boards. Typical stock removal is .002 in.; parallelism, .0002 in.; size, .001 in.

Stamped steel parts are finish-ground to close tolerances at rates up to 700 per hour by the Teletype Corp. Use of grease-board loading and high-powered Mattison Vertical Spindle Surface Grinders makes this performance possible.

Over 2,000 varieties of parts are ground on three Mattison machines. Boards with 100 or more pieces held with axle grease are delivered to each operator. He reverses the board on the magnetic chuck to quickly load the grinder, reducing setup time. Parts are loaded on the boards right from the punch presses. Two of the grinders have been in service for ten years without a shutdown for major maintenance. Call your Mattison dealer for details.

MATTISON
MACHINE WORKS
ROCKFORD, ILL. U.S.A.



HIGH-POWERED
PRECISION
SURFACE
GRINDERS

For more data circle **497** on Reader Service Card

new shop equipment . . .

PRESS AVAILABLE IN EITHER FLYWHEEL OR GEARED TYPE

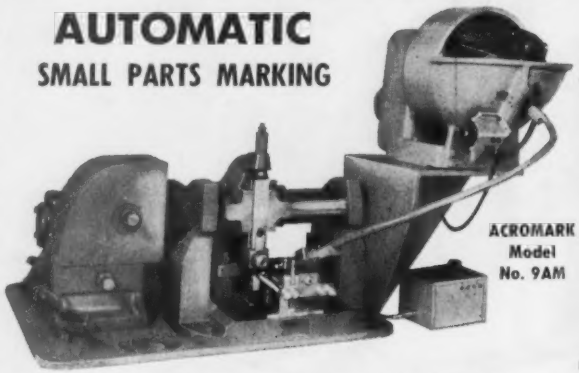
The Federal Press Co., 704 Division St., Elkhart, Ind., has announced the addition of a large capacity press to its line of metalworking presses. Designated as the Model 55, this 56 ton unit has been designed with oversize dimensions in order to accommodate larger dies.

According to the manufacturer, the Model 55 will economically handle laminations, trimming of die castings and similar bulky operations, which would otherwise tie up larger and more costly equipment. Companion presses, already in the company's line, are the Models 33 and 44. They feature generous dimensions, but are of 26 and 35 ton capacities, respectively.

Important dimensions of the Model 55 include a 4 inch stroke standard with up to 12 inches available at extra cost. The ram area is 11¼ by 24 inches standard; available up to 11¼ by 36 inches. The shut height is 12¼ inches standard; up to additional 21 inches available with frame extension. Bed to slide, stroke down adjustment up; 15 inches. The throat depth is 15 inches standard; also 17 inches available. Opening through back is 22 inches standard; also 26 inches available. The bolster plate is 36 by 28 inches.

The Model 55 is available in either flywheel or geared type, in mechanical or air clutch models. It offers many de-

AUTOMATIC
SMALL PARTS MARKING



ACROMARK Model No. 9AM

Mount it in your production line. Nipples, sleeves, plugs, nuts and other small parts are conveyor fed into the hopper. Automatic marking follows with ejection to the next operation. Quiet, smooth—long die life—minimum of power and maintenance—these are but a few of the reasons why you should consider ACROMARK 9AM machines.

Agents in many industrial areas. Write for series 9A Catalog today.

ACROMARK
THE ACROMARK COMPANY
9 MORRELL ST., ELIZABETH, NEW JERSEY
"THE ORIGINAL MARKING SPECIALISTS"

For more data circle 498 on Reader Service Card

RADIAC®

TYPE "JH" ABRASIVE CUT-OFF MACHINE

FOR WET CUTTING ONLY

CUTTING HEAD OPERATES EITHER MANUALLY OR HYDRAULICALLY - - WITH VARIABLE FEEDS & STROKES

•

Increases production through ease of operation

Photo through courtesy of Standard Pressed Steel Co., Jenkintown, Pa.

Operated by a 10 H.P. Motor and using an 18" Rubber Bonded RADIAC Abrasive Blade, this de Sanno Type "JH" Abrasive Cut-off Machine introduces new production economies and operating efficiency. Its hydraulically operated cutting head reduces operator fatigue. It features a foot treadle for operating the work vise, and an emergency reversing rod with mushroom button. Specially designed for production cutting of steel bars up to 2⅝" D., and tubing up to 4" O.D.

There are 10 other types of RADIAC Cut-off Machines—and a complete line of Abrasive Cut-off Blades—to meet your specific requirements. Write for illustrated Bulletin today. Exclusive dealers located throughout the United States.

Use **RADIAC** *Blades with* **RADIAC** *Machines*

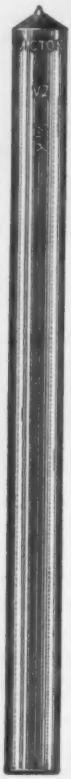
A. P. DE SANNO & SON
INCORPORATED

PHOENIXVILLE PENNA., U.S.A.

Manufacturers of Abrasive Cut-off Machines • Abrasive Cut-off Blades • Grinding Wheels

For more data circle **499** on Reader Service Card

Another
VICTOR VALUE



Top Quality
Lowest Prices

Our Special Import . . .

DIAMOND
WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
¼	$ 6.00	$ 2.85
½	12.00	5.00
¾	21.00	7.50
1	30.00	10.25
1½	54.00	15.00
2	75.00	20.00
2½	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for $1.00 each extra.

Order today—Immediate Delivery From Stock!

VICTOR
MACHINERY EXCHANGE, INC.
Dealers in Tool Room Equipment
Dept. B, 251 Centre St.
Tel.: CAnal 6-5575, New York 13, N. Y.

For more data circle 500 on Reader Service Card

new shop equipment . . .

Federal Model 55 Large Capacity Press

sign and construction features which are standard in all Federal presses. These features include Timken bearings, oversize crankshafts, solid web type ways and gibs, non-repeat safety clutch and front operated hydraulic recline mechanism.

For more data circle 112 on Reader Service Card

★ ★ ★

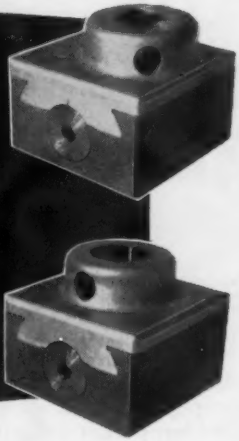
DIAL TEST INDICATOR HAS 0.030 INCH RANGE

Transocean Trading Co., 6453 Santa Monica Blvd., Los Angeles 38, Calif., recently announced the availability of the Verdict Model C Dial Test Indicator. Finished in satin-chrome, it is a well designed, robust mechanism combined with fine work-

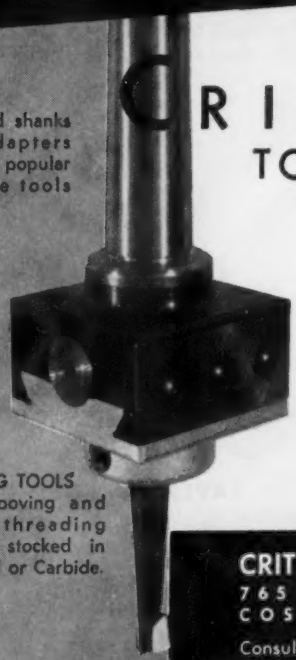
Which boring head will do your job?

CRITERION makes a wide range — 1½ to 7 inches in diameter. Bore accurate holes ⅛ to 20 inches.

CRITERION Heads feature widely spaced graduations — Easy reading — Accurate adjustment — Rugged construction — Dependable operation. Built for long life and chatter-free performance.



Ground shanks and adapters for all popular machine tools



BORING TOOLS
Boring, grooving and internal threading tools are stocked in High Speed or Carbide.

CRITERION
TOOL PRODUCTS

Select your boring head for ROUND or SQUARE shank tools.

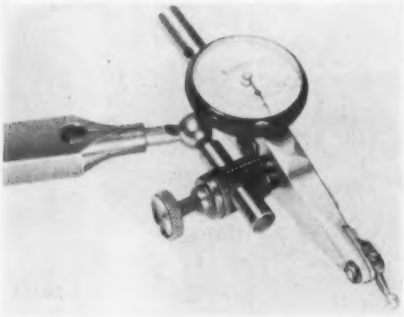
DIVERSIFIED OPERATION
Check the application of these tools on Turrets or Automatic Lathes.

MAXIMUM OFFSET TRAVEL
Save time—Money—Eliminate excessive tool change.

CRITERION MACHINE WORKS
765 WEST SIXTEENTH STREET
COSTA MESA, CALIFORNIA
Consult your dealer or write for free catalog.

For more data circle **501** on Reader Service Card

new shop equipment . . .



View of Verdict Model C Dial Test Indicator

manship and finish, resulting in an accurate, sensitive instrument which will withstand years of rugged service. A ¼ inch spigot, as well as the side clamping holder, permit unlimited positioning of the instrument. Other features include rotatable bezel, reversing lever and ratchet contact point. The 1 inch dial, clearly calibrated for easy reading in 0.001 inch graduations, has a 0.030 inch range.

For more data circle **113** on Reader Service Card

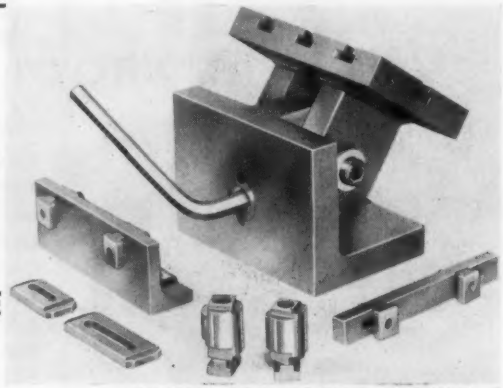
★ ★ ★

END MILL PREVENTS DEFLECTION

The "Controlled-Penetration" End Mill, recently announced by The Do-All Co., Des Plaines, Ill., provides unusual accuracy and long life for cutting tough, hard to machine materials such has titanium, stainless steel and similar alloys.

This end mill contains scientifically designed grooves or notches that are accurately ground across the flutes. These grooves produce small ridges or lobes of material directly into the path of each tooth. This facilitates the penetration of the cutting edges into the

SMITH'S
New and Improved
ADJUSTABLE MULTI-ANGLE GRINDING FIXTURE
(PATENTS PENDING)



FEATURES:

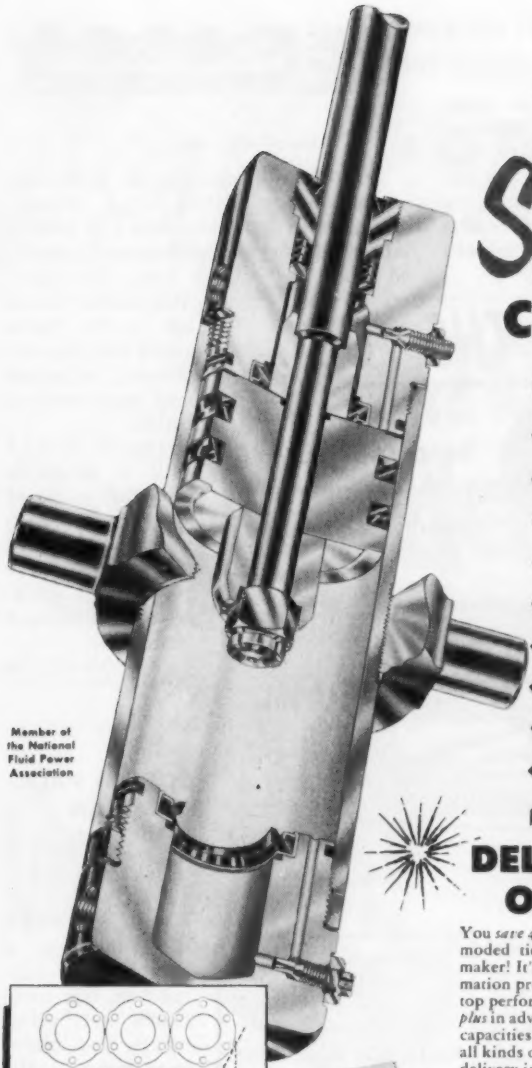
SAVES ITS COST QUICKLY

• Easy Adjustment—worm gear operated to all angles, compound and standard • Use horizontally and vertically • All moving parts completely sealed • Two Sizes: 3" x 3" and 4½" x 3".

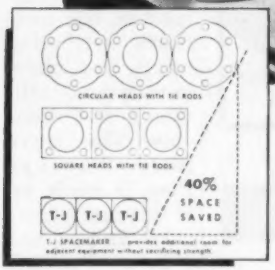
Write for Illustrated Circular and Prices

F. E. SMITH, Toolmaker 840 SOUTH MAIN ST. ATTLEBORO, MASS.

For more data circle **502** on Reader Service Card



Member of the National Fluid Power Association



all the EXTRAS are standard with T-J Spacemaker CYLINDERS

- **NEW** *exclusive* ingenious cushion designs . . . Super Cushion Flexible Seals for Air . . . New Self-Aligning Master Cushion for Oil.
- **STRONGER** than outmoded tie rod design, proven through actual tests. No tie rods to stretch.
- **SOLID STEEL HEADS** throughout the full line.
- **COMPACT DESIGN** eliminates tie rods, increasing the strength and reducing mounting space required, providing extra room for adjacent equipment.
- **HARD CHROME PLATED** body bores and piston rods . . . assure you of long trouble-free service. (Standard at no extra cost.)
- **METALLIC ROD SCRAPER**, not just a wiper, actually removes foreign matter from the rod.
- **PILOTED PACKING GLAND** with extra long bearing. Additional strength and support to the piston rod.
- **OIL** pressure to 750 p.s.i. AIR to 200 p.s.i.

DELIVERY OFF THE SHELF!

You *save 40% space* when you switch from outmoded tie rod cylinders to the T-J Spacemaker! It's stronger, too! Fits right into automation programs in countless plants. Delivers top performance and dependability with a big *plus* in advanced features. Wide range of styles, capacities . . . reduces man-hours and costs in all kinds of push-pull-lift operations. Off-shelf delivery in 64,000 combinations!

NEW LITERATURE—Send today for new Catalog SM56 with complete engineering details on Spacemaker line. Write The Tomkins-Johnson Co., Jackson, Mich.

T-J

TOMKINS-JOHNSON

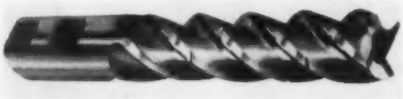
RIVETERS . . . AIR AND HYDRAULIC CYLINDERS . . . CUTTERS . . . CLINCHERS

For more data circle **503** on Reader Service Card

For more data circle 502 on Reader Service Card

new shop equipment . . .

material. It is these ridges or lobes of extra material that apply pressure to the cutting edge, forcing it to take a uniform cut. Since these grooves are staggered on the flutes, the lobes are completely removed by the succeeding tooth. The resulting cut has a smooth surface and good finish.



DoAll "Controlled-Penetration" End Mill

The "C-P" design has an additional advantage for cutting tough, stringy materials in that the chips are broken into small pieces that are easily cleared from the cutting area. Therefore, they cannot build up in the tooth gullet to cause additional deflection and poor surface finish.

The "C-P" End Mill is available in a full range of sizes from $\frac{3}{8}$ inch to $1\frac{1}{2}$ inches in the long flute type, and is stocked as a standard item.

For more data circle 114 on Reader Service Card

★ ★ ★

BORING PACKAGE PLAN

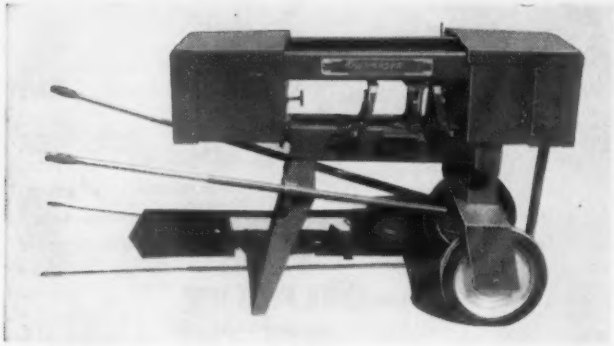
Portage Double Quick, Inc., 1041 Sweitzer Ave., Akron 11, Ohio, has announced a new idea in boring bar, bar cartridges and boring heads that offers convenience, efficiency and economy. This Sure Bore Package Plan is made up of three packages:

(1) Boring Bar 4-Some Package,

TAKE IT TO THE JOB . . .

KALAMOBILE

—a metal-cutting band saw that's truly portable—handier than ever!



Here's the popular Kalamazoo Model 610 metal-cutting band saw on the handiest chassis you ever saw. Provides greatly increased portability with its rubber-tired 12-inch wheels and telescoping handles. One man shifts the 610 from job to job with ease. Capacity 6" Rounds—10" Flat.

610-D without coolant attachment.
610-W with coolant attachment.
Kalamobile chassis M6A fits all 610 models.

MACHINE TOOL DIVISION

Kalamazoo TANK and SILO CO.

657 Harrison Street, Kalamazoo, Michigan

For more data circle 504 on Reader Service Card

For more data circle 503 on Reader Service Card

YOU GET more* WHEN
YOU BUY BEARINGS FROM YOUR

Bunting®
DISTRIBUTOR

*more dependability

Simplified standardized size listing including all ASTM sizes—an exclusive Bunting feature.

YOU CAN DEPEND ON BUNTING, the Bunting distributor and on Bunting Stock Bronze Bearings and Bars. The very highest standards of metallurgical and manufacturing processes assure uniform high quality in Bunting Cast Bronze and Bunting Sintered Powdered Oil-filled Bronze Bearings and Bars. Bunting distributors are the leading responsible distributors in their respective areas. They carry ample stocks at all times.

Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars— Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.

Bunting BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL.

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities

For more data circle 505 on Reader Service Card

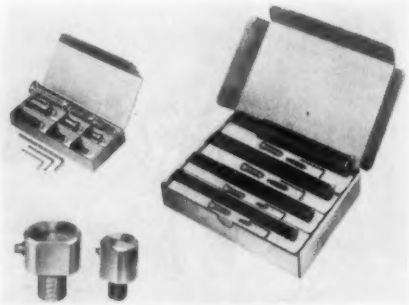
657 Harrison Street, Kalamazoo, Michigan

For more data circle 504 on Reader Service Card

(1) Boring Bar
4-Some Package,

new shop equipment . . .

which includes four boring bars with boring range from 1 inch to 3⅛ inches in diameter. This is accomplished by including a short and long carbide tipped tool bit for each size bar. Micrometer adjustment is made with individual adjusting wrenches for each bar. Micrometer scale is graduated in large, easy to read divisions. The bars are furnished with tool bit mounted at 53 or 90 degree angles.

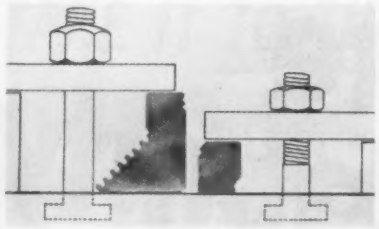


Portage Double Quick Sure Bore Package Plan

(2) Boring Bar Cartridge Package, consists of three complete assemblies including cartridges, carbide tipped tool bits and wrenches. Micrometer adjustment eliminates guessing for hole size. Tools are easily changed and removed for resharpening. Rigid clamping affords a tool that has no backlash in either direction. Cartridge assemblies are furnished to mount in boring bars at 53 or 90 degree angles.

(3) Boring Head 2-Some Package, includes a 2 and 3 inch diameter head, two long and two short tool bits offering a boring range from 2¾ to 5¼ inches in diameter. Boring heads have carbide tipped tool bits for roughing operations.

For more data circle 115 on Reader Service Card



MERMOD
SET-UP BLOCKS

- **Adjustable in steps of 1/25″**
- **Rounded teeth fit and mate perfectly**
- **Case hardened and tempered steel**

ELIMINATE HUNTING FOR PROPER STRAP SUPPORTS AND REDUCE SET-UP TIME TO A FRACTION

Eliminate inaccuracies and accidents due to improper strapping

WHY NOT INCREASE YOUR PRODUCTION ACCURACY AND PROFITS?

Sole U.S.A. Representatives:

NEISE MODERN TOOLS

KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

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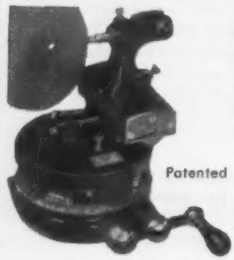
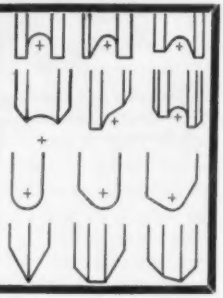


WHY WASTE TIME?

Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

Patented

Write for Price and Folder.
Representatives Wanted in Some Areas.



JEON MANUFACTURING CO.
P. O. BOX 6750 WASHINGTON 20, D. C.

For more data circle 507 on Reader Service Card

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities
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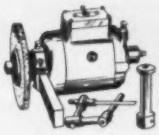
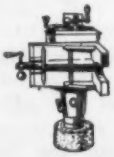
GENERAL PURPOSE

GRINDERS ... DRILLS



TOOL POST

These superb electrical grinders and drills set the pace for highest quality and efficiency . . . and for amazing savings in cost and maintenance. Preferred by industry everywhere!



VERTICAL SPINDLE

Attractively Priced
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United States Electrical Tools

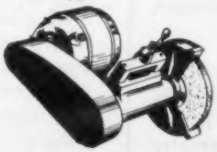
Over 60 years of Service to Industry

GRINDERS AND DRILLS

¼" TO 1½"

United States Electrical Tools are electrically and mechanically correct.

ALL ROTATING PARTS AND SPINDLES ARE PRECISION - BALANCED DYNAMICALLY BY LATEST ELECTRONIC EQUIPMENT.



PRECISION LATHE

The United States Electrical Tool Co.
3640 LLEWELLYN ST., CINCINNATI 23, OHIO

For more data circle 508 on Reader Service Card

new shop equipment . . .

HYDRAULIC PROFILE LATHE IS RIGIDLY BUILT

A modern, improved electrically controlled, hydraulically actuated profile lathe, designed for use by semi-skilled operators, has been announced by Cleveland Hobbing Machine Co., 1311 Chardon Rd., Cleveland 17, Ohio. The heavy cast construction of the lathe provides unusual rigidity. It permits full utilization of the advantages of carbide and ceramic tools, allowing spindle speeds to 5,000 r.p.m. and motors to 50 h.p. While ideal for large repetitive production runs, the quick set-up and changeover features provide versatility for small quantities.

The Cleveland Profiler duplicates from flat or round templates or simply from the sample part. Quick, easy sequence control settings are made on a panel of adjustable stops, mounted on the front of the machine. Profiling is obtained by use of the balanced, spool, hydraulic tracing stylus requiring a force of less than 10 ounces. The profiling slide is hydraulically actuated and cycles automatically. It can take up to four automatic recycle passes at adjustable, preset depths of cut. Two speed changes and two feed changes can be preselected for operation in any pass, combination of passes, or all passes.

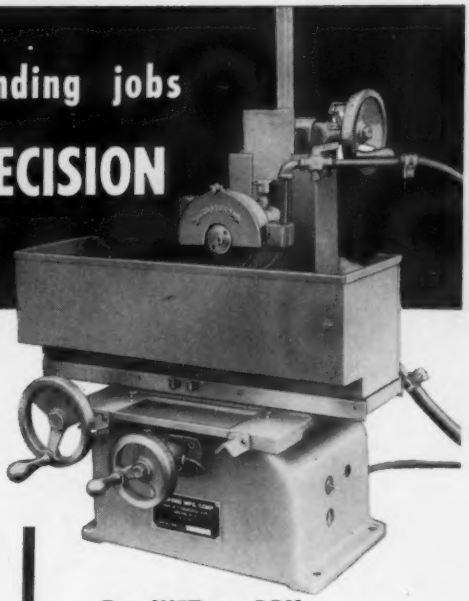
Electric controls and panels are J.I.C. standard. They are completely interlocked with the hydraulic system.

HOLD IT!
FIRMLY BUT GENTLY
WITH
WOODWORTH CHUCKING EQUIPMENT
Our tough looking character who is holding the smiling baby clearly demonstrates one fact: whenever you are holding anything it should be secured with gentle firmness. And this is so true when considering chucking equipment.
Your best machine will produce only as accurately as its work-holding device permits and Woodworth manufactures the most rugged, accurate and dependable chucks for precision machining in America.
We invite your inspection and consideration of N. A. Woodworth products. There is a Woodworth Sales Representative in your area and a letter to the N. A. Woodworth Company will place him promptly at your service.
WOODWORTH
1300 EAST NINE MILE ROAD
DETROIT 20, MICHIGAN
For more data circle 509 on Reader Service Card

to do small grinding jobs

to **MICRO-PRECISION**

FAST...



you need the

SANFORD
Model SG
SURFACE GRINDER

This unrivalled small parts grinder can be depended upon for micro accuracy. It's easy to use too . . . every hand wheel and operating switch is at your finger tips.

Designed and built by engineers and tool makers of rare foresight for tool, die and gage work, it has been constantly preferred after these many years of proven worth.

Write for fully illustrated literature, replacement parts and special attachments data with price list.

For WET or DRY grinding, specify optional equipment.

PARTIAL SPECIFICATIONS—

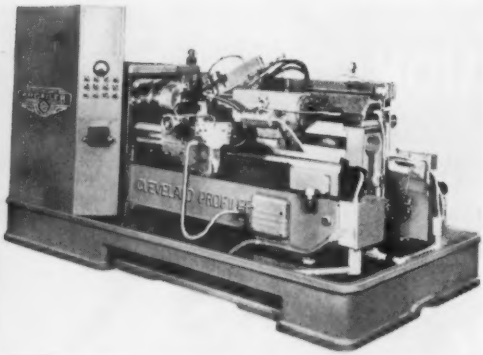
Chuck Surface—3″x5″ or 4″x6″.
Table travel—8″, traverse 4″.
Vertical head movement—6″.
Work area under 4″ wheel—6″, with chuck—4″.
Standard grinding wheel—4″ x ⅜″ x ½″.
Spindle speed—approx. 5500 RPM.
Motor, 1/6 HP, single or 3 ph., dynamically balanced.
Dimensions—23″x30″x27″ high.
Net wt. approx. 160 lbs.

Representatives in major industrial areas

SANFORD MANUFACTURING CORP.
1022 Commerce Ave., Union, N. J.

For more data circle **510** on Reader Service Card

new shop equipment . . .



Cleveland Hydraulically Actuated Lathe

In addition, the Cleveland Profiler features low spindle inertia with quick start and stop; simple efficient drive; automatic pressure lubrication of all parts; infinitely variable feed ranges; twin hydraulic pumps; and an oversized, air cooled clutch-brake unit. The lathes are available with production proven automatic or semi-automatic loading and unloading equipment and chip conveyors. They may be obtained with double saddles; multiple back slides, automatic size control; variable speed drive for constant cutting s.f.m.; rocking or indexing toolholders; and thread rolling attachments.

For more data circle **116** on Reader Service Card

★ ★ ★

RAM TYPE MILLING MACHINE

Van Norman Machine Co., Springfield 7, Mass., has announced its line of 28A Ram Type Millers. The 28A features Van Norman adjustable cutter head as standard equipment. According to the manufacturer, this development means that, with one ma-

Greater Precision! Increased Production!

KUTMORE ADJUSTABLE HOLLOW MILLS

Any combination of . . . turning . . . tapering . . . facing . . . chamfering . . . trepanning in one pass. Exclusive micrometer adjustment feature for rapid set-up. Cutting capacities from 1/32" to 2" diameter in standard stock.

WRITE FOR CATALOGUE No. 20MM

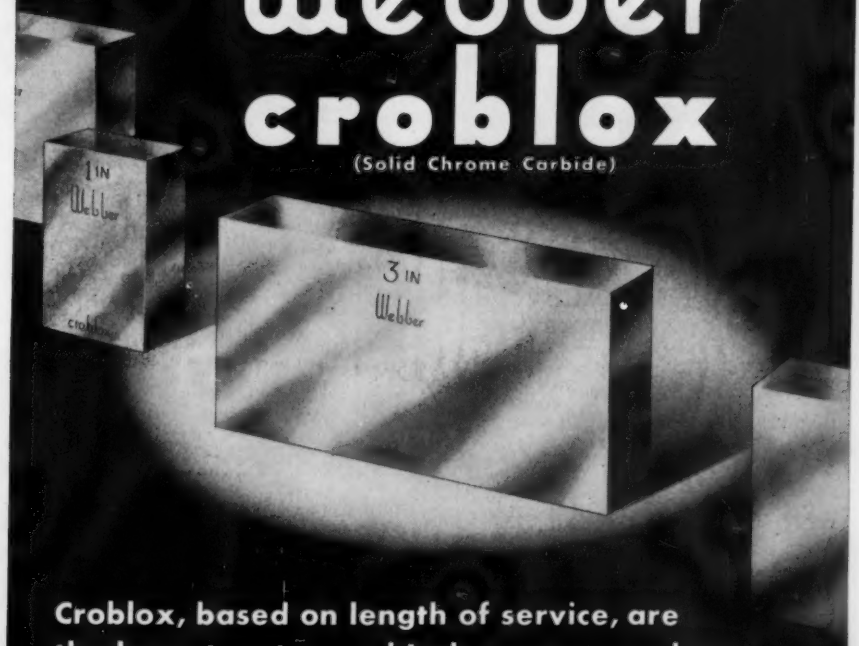
Our engineering department is at your disposal on your hollow mill problems.

CARL WIRTH & SON, INC.
1625 CLINTON AVE. NO.
ROCHESTER 5, N. Y.

For more data circle **511** on Reader Service Card

Webber croblox

(Solid Chrome Carbide)



Croblox, based on length of service, are the lowest cost gage blocks money can buy

Many years of use by America's foremost precision manufacturers have proven beyond the shadow of a doubt that Croblox will last up to fifty times longer than standard steel blocks. These diamond-hard blocks will safeguard your production and *insure your peace of mind.*

Available in accuracies to meet every need —!

"B"	± .000006" — .000002"	"A"	± .000004" — .000002"	Lab. Master	± .000002" — .000002"

Complete sets as low as $350.00

Would you like full information about money saving, money making Croblox? Just drop us a line.

WEBBER GAGE COMPANY

12899 Triskett Road, Cleveland 11, Ohio

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QUALITY AT LOW COST

QUEEN CITY HEAVY DUTY GRINDERS DISC GRINDERS AND BUFFERS

QUEEN CITY Heavy Duty Disc Grinders and Buffers save you money when you buy and during every hour of use. Ruggedly designed, they feature special heavy duty bearings and motors. So good they're offered on a 30-day trial, yet priced 20 to 30% under competing makes.

Choose from the complete range of QUEEN CITY Grinders and Buffers . . floor and bench types . . . in sizes from ⅓ to 10 H.P.

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WRITE FOR FREE CATALOG TODAY!

QUEEN CITY MACHINE TOOL CO.
3911 Kellogg Ave., Cincinnati 26, Ohio

"High Quality—Low Cost—For Over 50 Years"
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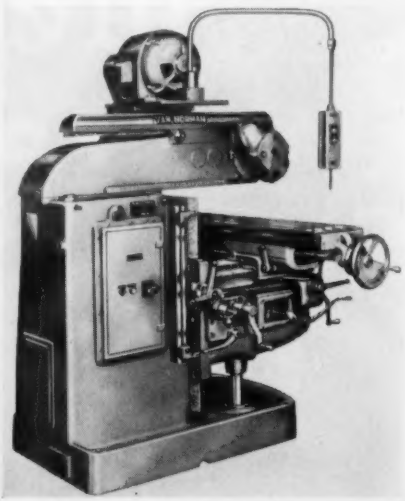
new shop equipment . . .



Van Norman 28A Ram Type Milling Machine

chine and without attachments, milling machine operators can now do horizontal, vertical and angular milling. This means increased production with lower milling costs.
For more data circle 117 on Reader Service Card

★ ★ ★

SPECIAL PURPOSE PRESS

Benchmaster Manufacturing Co., 1835 West Rosecrans Ave., Gardena, Calif., recently announced the availability of a special 2 ton fixed bed gap frame press, which has several new features and which is furnished as a stock Benchmaster model. It is equipped with a mechanical clutch which is actuated by an electric solenoid. On the left end of the spindle is a positive, single revolution stop and two cam operated micro switches, which prevent the electrical system from double tripping. The stopping device consists of

A wheel for every job . . .

For every surface grinding job . . . whether tough as copper or fragile as glass . . . there's a Blanchard wheel that's *best.*

Blanchard grinding wheels, for use on Blanchard Surface Grinders, are made in cylinder, segment and sectored types. By selecting from a variety of vitrified, resinoid and silicate bonds and a number of different abrasives, Blanchard is able to make exactly the right wheel for every surface grinding job.

Precision duplication in the manufacture of every Blanchard grinding wheel assures you of identical results on all materials—regardless of finish or stock removal required.

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

PUT IT ON THE **BLANCHARD**

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass.

Gentlemen: Please send me free copies of "Blanchard Abrasive Wheels and Segments" and "The Art of Blanchard Surface Grinding" (3rd edition)

NAME_____ STREET_____

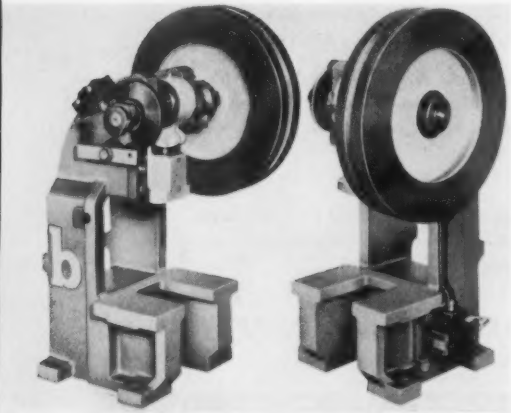
FIRM_____, CITY_____ ZONE____ STATE_____

For more data circle 514 on Reader Service Card

"High Quality—Low Cost—For Over 50 Years"
For more data circle 513 on Reader Service Card

ping. The stopping device consists of

new shop equipment . . .



Benchmaster 2 Ton Fixed Bed Gap Frame Presses

a crankshaft mounted disc notched on its periphery for a spring loaded pall. When the pall engages, the crankshaft stops 3/32 inch past top dead center. Ram location at the stop position is held to top dead center, with an accuracy of plus 1/64 inch, minus zero.

Special ears on the ram are drilled for bolting the ram to the die set. Tolerances throughout are refined to insure complete interchangeability of all tooling developed for the press. This Benchmaster operates at 280 to 290 strokes per minute, has a 5⅛ inch die space (ram up), and a standard stroke of ¾ inch. Opening through the back is 4½ inches. The bed area is 4 by 7⅛ inches and is 2 inches lower than the standard 2 Ton Benchmaster.

For more data circle 118 on Reader Service Card

★ ★ ★

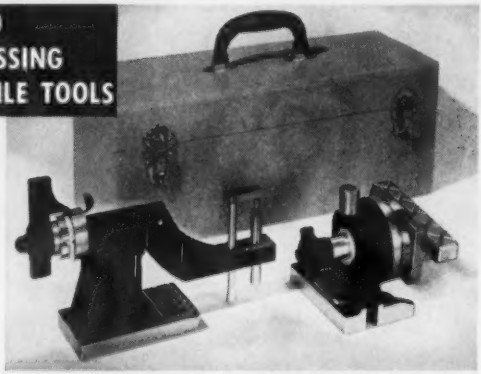
ELECTRIC HAMMER

A heavy-duty electric hammer, weighing just 7½ pounds, is now be-

Now ANGLE TANGENT TO RADIUS WHEEL DRESSING WITH NEW VERSATILE TOOLS

MIGHTY GOOD AT ANY PRICE
BUT TOPS AT ONLY $149.50
(Both tools including diamonds)

The G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on a 7 inch or 10 inch wheel, and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter free operation. The G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1°; an excellent time saver to set up small jobs to be milled, drilled, tapped, etc., on any desired angle.



Our fixtures will dress most radii and angles tangent to each other, similar to those shown below.

FREE handsome, wooden storage box. Write for complete information.

Distributorship available in select territories.

ROTHFUSS TOOL COMPANY

BOX 22, ELMWOOD STATION PROVIDENCE 7, R. I.

For more data circle 515 on Reader Service Card

For more data circle 514 on Reader Service Card

STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

On Brown and Sharpe, and other automatics

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $45 you get a dozen sets of 3/4—16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.

free: ***"Unified and American Screw Thread Digest"***

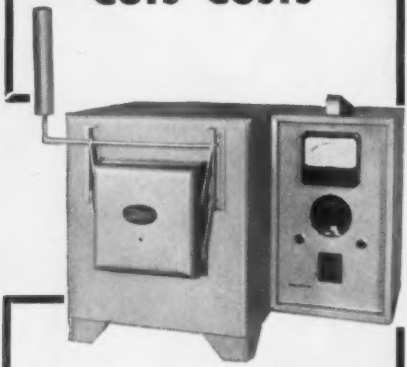
THE EASTERN MACHINE SCREW CORPORATION

40-50 BARCLAY ST. • NEW HAVEN, CONN.

For more data circle 516 on Reader Service Card

COMPANY
BOX 22, ELMWOOD STATION PROVIDENCE 7, R. I.
For more data circle 515 on Reader Service Card

"Do-It-Yourself"
Saves Hours
Cuts Costs



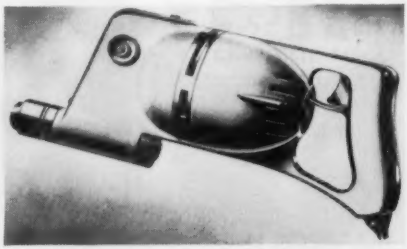
Why let someone else set your production schedules? If you now depend on outside heat treat sources, consider all the advantages of heat treating tools, dies, parts, etc., right in your own shop with a versatile TEMCO electric furnace. No bother with time-wasting pickup and delivery of work... no downtime while waiting for it to come back. Saves hours on jobs. Cuts costs... for TEMCO furnaces are economical to own and operate. Easy to hook up... easy to use. (Shown above is Type 1600 Furnace with Type 400T TEMCOMETER Control Cabinet). The TEMCO line includes eight models with chamber sizes from 4" x 3¾" x 3¾" to 9½" x 8½" x 18". $65.00 to $603.25 complete with controls. Write for data and nearest dealer's name.

TEMCO

ELECTRIC FURNACES
Thermo Electric Manufacturing Co.
488 Huff St., Dubuque, Iowa

For more data circle 517 on Reader Service Card

new shop equipment . . .



Modern Slugger Heavy-Duty Electric Hammer

ing manufactured by Modern Manufacturing Co., Inc., Willow Grove, Pa. Lightweight, yet powerful, the Modern Electric Slugger Hammer has been designed to simplify drilling, cutting and chiseling problems. For instance, a ⅞ inch hole, 1 inch deep, can be drilled in concrete in just 30 seconds. Equipped with a quick change chuck, the Modern Electric Hammer can be plugged in anywhere, and will handle any of the company's full line of 40 different tools.

For more data circle 119 on Reader Service Card

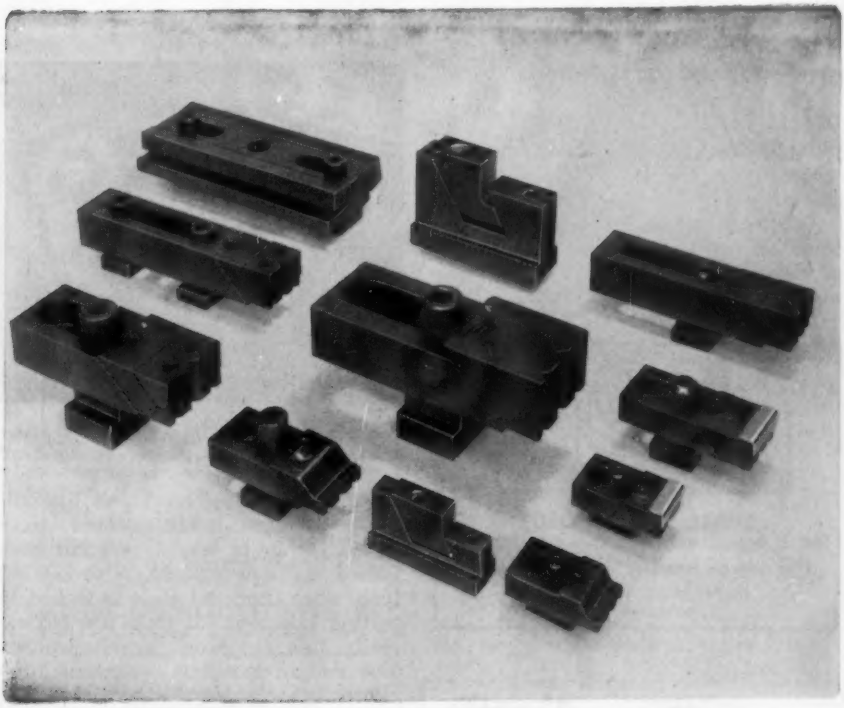
★ ★ ★

DOUBLE ACTION HEADS AVAILABLE FOR GEAR SHAPER

The availability of a two position cutting head, that permits cutting two different pitch diameters on one part (as on two step clutches) in one set-up of Shear-Speed Gear Shapers, has been announced by Michigan Tool Co., 7171 East McNichols Rd., Detroit 12, Mich. All 1800 Series Shear-Speeds now in use can be modified to accept this cutter head.

Simplicity and speed are keynotes of operation of the cutting head. Two sets of teeth are cut in sequence with the head moving to two stop positions. Differential tool feed cuts the varying

For more data circle 516 on Reader Service Card



Where you can get . . .

DOWN-HOLDING DEVICES for any machine table or face plate

J & S All-Purpose Jaw Clamps eliminate U-Clamps, Straps and Fingers for lathes, planers, milling machines, boring millers, jig borers, etc.

The only Precision Swivel Vise that Mounts Low. Swivels. No Pedestal.

Faster Set-up with any of the 5 Models of J & S Jaw Clamps—one adjusting screw has a holding force of 2½ tons on the Small Model, to 12 tons on Jumbo Model for positioning and holding the work-piece.

Single powerful clamping action obtained from the 45° angle inward and downward movement of the jaw clamp is easily applied and controlled.

Compact, efficient design of J & S Jaw Clamps eliminates the usual obstruction problems—no interference with measuring tool readings.

See your industrial distributor or write today for free literature.

WHEEL DRESSERS — J&S TOOL CO. INC. — JAW CLAMPS • PRECISION VISES • DOWN-HOLDING DEVICES

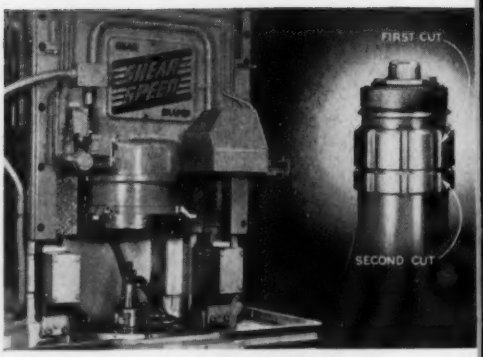
CLAMPCUT ONE BAR

J & S TOOL CO., INC. | **871 DORSA AVE. LIVINGSTON, NEW JERSEY**

For more data circle 518 on Reader Service Card

pitch diameters. The new method, when applicable, is said to eliminate second set-ups.

In operation, as set up for an automotive shifting ring having two sets of eight teeth in-line but on pitch diameters different by 0.004 inch, the

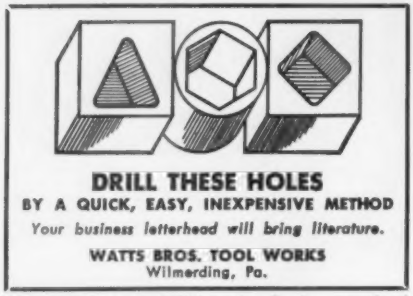


Michigan Series 1800 Shear-Speed Gear Shaper equipped with two position cutting head

part is manually loaded and hydraulically clamped. The deeper teeth (1.187 inches in length) are cut first. Infeed of the nine blade cutter is 0.119 inch, after the head slide is locked in cutting position. All tools are fed radially into the work simultaneously. The end of the first operation automatically actuates the head into the second position where it is locked for the second cut. Cutter infeed for the shallower depth teeth is 0.115 inch. For both operations, 60 strokes at a surface feed of 20.9 f.p.m. is used. Production rate is 60 parts per hour.

Downfeed of the cutter head is controlled by an eccentric relief cam and is position-held by a double hydraulic cylinder arrangement.

For more data circle **120** on Reader Service Card



DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For more data circle **519** on Reader Service Card

Here's the dope!
TAMMS
DIRECTIONS: WIPE OFF OIL OR GREASE. APPLY WITH CLOTH OR BRUSH
BLUE LAYOUT DOPE
TAMMS INDUSTRIES, INC.
228 N. LaSalle St., Chicago 1, Ill.
WRITE for SAMPLE
DRYS FAST-RESISTS OIL
WON'T CHIP, CRACK OR FLAKE OFF!

For more data circle **520** on Reader Service Card

REICH — THE ONLY 3-WAY PRECISION TEST INDICATOR

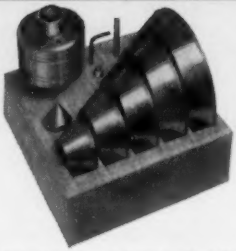
Accurate and repeated reading in either direction. Performs in conical bearings. Non-rust, non-magnetic movement. .014" reading.

Price $9.00
Write for folder

J. R. REICH MANUFACTURING CO.
201 E. Stroop Road **Dayton 9, Ohio**

For more data circle **521** on Reader Service Card

SAVE SET-UP TIME



with

REPCO LIVE CENTER SET

Set consists of heavy duty live center plus 6 interchangeable adapters from a point to 6¼" dia. ball. Saves costly set-up and machining time often needed to make special, large diameter centers.

SIZES: 3 to 5 M. T. B&S, Jarno, and Straight Shanks available. Female and special centers on request.

WRITE FOR BULLETIN NO. 101
DEALER INQUIRIES INVITED

ROCKFORD ENGINEERED PRODUCTS CO.
2324 23rd Avenue • Rockford, Illinois

For more data circle 522 on Reader Service Card

HELIOS
PRECISION DIAL CALIPER

6"
$31.80
F.O.B. New York

Guaranteed Accuracy Within .001"
Reading .001"

- SPEED
- PRECISION
- DEPENDABILITY

Full scale readings of 5"-6"-8"-10" available. Also Foot with Scriber to convert to Vernier Height Gage.

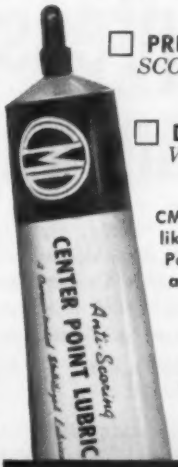
Ask for catalog and prices of other Standard Calipers.

NEISE MODERNTOOLS
KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

For more data circle 523 on Reader Service Card

What is your CMD LUBRICATING PROBLEM?

- ☐ LATHE CENTER LUBRICATION *SCORING-GALLING*
- ☐ GRINDING CENTERS *LUBRICANT WASHOUT*
- ☐ DRAWING *SCORE MARKS-DIE WEAR*
- ☐ STEADY RESTS *WORK PIECE DAMAGE*
- ☐ PRESS FITS *SCORING-SEIZING*
- ☐ DIE POSTS *WEAR-FREEZING*



CMD Lube has solved many like it with excellent results. Perhaps CMD will be your answer, too!

CHECK AND SEND IN FOR SAMPLE

Anti-Scoring Lubricant
CHICAGO MANUFACTURING AND DISTRIBUTING CO.

1910 West 46th Street, Chicago 9, Illinois

For more data circle 524 on Reader Service Card

new shop equipment . . .

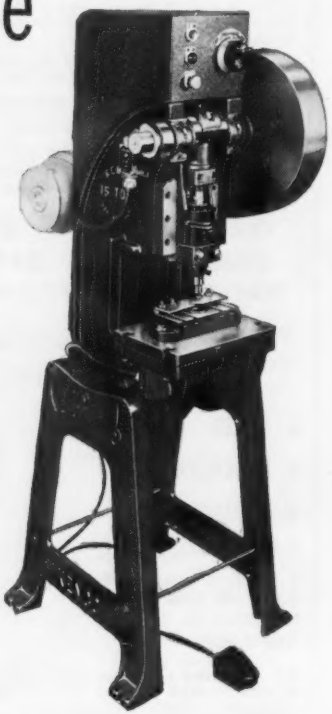
FILING MACHINE INCREASES OUTPUT

Newage Industries, Inc., 222 York Rd., Jenkintown, Pa., is now marketing the Rindis Filing Machine, which has been specially designed for filing, trimming and deburring a wide variety of small components such as moldings, pressings, castings, metal and wooden patterns, laminations, welded joints and printing blocks. Discs and rings with various teeth arrangements are provided for use at different speeds on an unusually wide variety of materials and finishes. The discs cut without heat, abrasive or coolant, while also retaining their shape without redressing. A small table, 12¼ by 4½ inches, which can be locked at various

★ ★ ★ ★ ★

KENCO

15-ton Electro-Safe
the safest
punch press
you can buy!



Single-trip control buttons are widely spaced, to keep hands clear of the danger zone. Operators must push *both* buttons at once... hold them until stroke reaches bottom, then release both buttons to start new cycle. Fail-safe operation. Impossible to "fudge." Impossible for press to double trip.

Versatile controls—You can change from "single trip" to "continuous stroke," or "inching" by merely turning a dial. You can change timing in seconds. No flywheel... no clutching. Write for details.

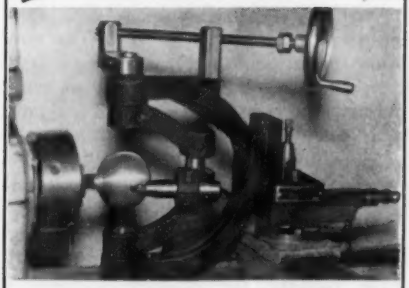
KENCO MANUFACTURING CO. *5211 Telegraph Road, Los Angeles 22, Calif.*

For more data circle **525** on Reader Service Card

new shop equipment

BRAZING-HARDENING PROCESS

New **RADITURN** ✓



CUTS ANY RADIUS

Convex, Concave or Ball

Patented

The accurate short cut for turning any radius. Adaptable to most any lathe.

Contact your tool supplier or write for details.

RETCO MFG. & SALES

1458 E. CLINTON • FRANKFORT, IND.

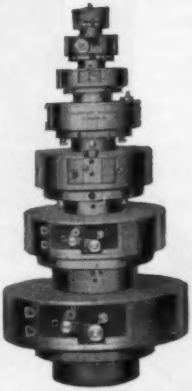
For more data circle **526** on Reader Service Card

MUMMERT-DIXON

FACINGHEADS

Two-way tool feed in 9, 12, 16, 20, 24, 30, 36, 40 and 46 sizes.

One-way tool feed in 6, 9 and 12 sizes. Automatic feed — convenient tool adjustment — quick feed reverse. Save time and costly set-ups.



Write for folder.

MUMMERT-DIXON CO.

120 PHILADELPHIA ST. • HANOVER, PA.

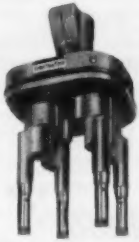
For more data circle **527** on Reader Service Card

THRIFTMASTER

your source for dependable

DRILLHEADS

Universal Joint Type Drillhead . . . Full Ball or Bronze Bearing Construction, Standard or Heavy Duty. From ½" minimum centers up. Capacities to ½" in Steel.



Single and Double Eccentric Type Adjustable Drillhead . . . Enclosed, Full Ball Bearing Construction. *New* Double Eccentric Type illustrated.

Special Fixed Center Drillhead . . . Made to your requirements. Full Ball Bearing Construction.

- We stock or can build the *right* drillhead for your jobs.
- Write for your free copy of the **THRIFTMASTER CATALOG** or phone for a rush, on-the-spot quote.

Also Makers of **DORMAN AUTOMATIC REVERSE TAPPERS**

THRIFTMASTER

Products Corporation

A SUBSIDIARY OF THOMSON INDUSTRIES, INC.

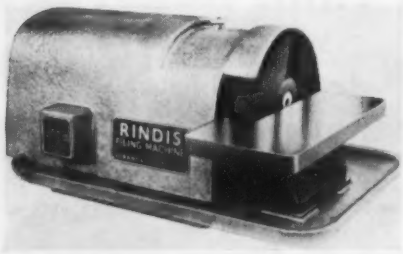
1034 N. PLUM STREET • LANCASTER, PENNSYLVANIA

For more data circle **528** on Reader Service Card

SHARP

LET *HIGH-SPEED*

new shop equipment . . .



Rindis Machine files, trims and deburrs

angles to the disc, makes holding and feeding objects to the disc or ring easy for fast operation. The material removed is claimed to contain no abrasive or foreign matter, and may be reclaimed. In precious metals, filing facilitates the production of small particles which are collected in the tray.

For more data circle **121** on Reader Service Card

BRAZING-HARDENING PROCESS FOR CARBIDE TOOLS

Whitman and Barnes, 40500 Plymouth Rd., Plymouth, Mich., is now releasing information regarding a special brazening-hardening process used in the making of its line of carbide tools.

Identified as "Perma-Braze," the advanced brazing-hardening process utilizes a special high temperature brazing alloy and scientifically controlled furnace procedure and equipment. This enables the carbide tip to be brazed at the same time the high-speed steel body is hardened. According to the manufacturer, this results in uniform body hardness and carbide tips that will not loosen due to braze failure. It is further stated that "Perma-Braze" carbide drills can be used for dry drilling of cast iron without fear of braze softening or melting.

For more data circle **122** on Reader Service Card

★ ★ ★ ★ ★

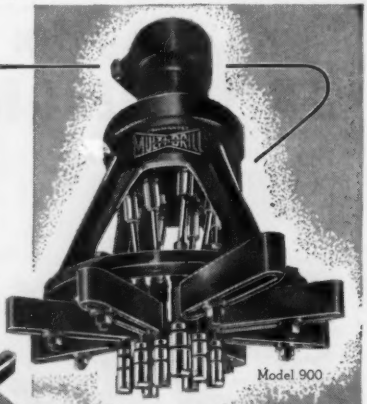
Adjustable
MULTI-DRILL
for *Production* Drilling

9" DRILLING AREA
AVAILABLE WITH 2 TO 8 SPINDLES

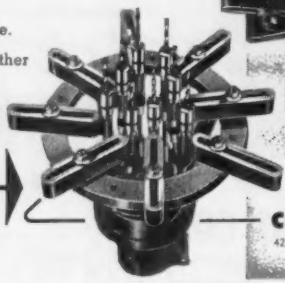
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to **any** hole pattern on or within a 9" circle; ½" minimum center distances; Drill sizes 1/32" to 3/8"
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.



Model 900



Locater arms are designed for fast, easy adjustment

Dependable Performance . . . proven by industry

FITS ANY DRILL PRESS

COMMANDER MFG. CO.
422 W. KINZIE STREET, CHICAGO 24, ILLINOIS

For more data circle **529** on Reader Service Card

SHARP
NAMEPLATE MARKING

The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

NAMEPLATE DETAIL PRESS.
- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.
1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS

For more data circle **530** on Reader Service Card

LET HIGH-SPEED KNOW-HOW
• Increase Production
• Reduce Costs • Improve Quality

—NEW, NOISELESS RIVET SPINNER

The new noiseless, motor-driven Rivet Spinner is the latest addition to the High Speed Hammer line of cold riveting machines and stakers. Has rivet capacity to $\frac{1}{16}$" diameter, spindle travel $\frac{3}{4}$" adjustable downward. Two models . . . floor or bench, designed for either foot or air operation. Produces absolutely uniform assemblies at every cycle, increases operator's efficiency. Air operated model eliminates fatigue. High Speed Hammer provides ***FREE ASSEMBLY ENGINEERING SERVICE.*** Send parts and/or prints. We'll recommend the right operation covering tools, procedure, cost estimate and equipment to use. No cost or obligation.

HIGH SPEED HAMMER CO., INC.
315 Norton St., Rochester 21, N. Y.

We have the most complete line of riveting machinery and can recommend the correct type machine, tooled and ready, to go into operation upon receipt.

For more data circle **531** on Reader Service Card

For Heat Treating Small Parts
—HUPPERT—
DeLuxe ELECTRIC FURNACES

Here's a series of compact, durable furnaces that are ideal for tool and die shops and small laboratories. Any desired temperature within the range of 300° to 1900° F. is controlled by an accurate, built-in Huppert temperature controller. All-steel construction — multi-insulation — sturdy Kanthal elements — counterweighted doors — removable porcelain tray.

Model No.	Inside Dimensions Wide	High	Deep	Temp. Range	Watts 110 Volts AC	Price
434DL	4¼"	3⅜"	4¾"	300°-1600° F.	920	$ 90.00
439DL	4¼"	3⅜"	9"	300°-1600° F.	1650	120.00
436DL	4½"	3¾"	6"	300°-1900° F.	1650	130.00
5DL	4½"	3¾"	9"	300°-1900° F.	1750	176.00
9DL	6"	6"	6"	300°-1900° F.	2200	200.00
669DL	6"	6"	9"	300°-1900° F.	3000	248.00
10DL	8"	4"	6"	300°-1900° F.	2000	220.00
849DL	8"	4"	9"	300°-1900° F.	3000	265.00

Available for 220 Volt AC at small additional cost.
Stainless steel housing slightly higher.

- Write today for literature on complete line of Huppert furnaces and ovens in floor and bench models.
- Ask for Hints on Heat Treating.

K. H. HUPPERT CO.
6841 COTTAGE GROVE AVENUE, CHICAGO 37, ILLINOIS
Manufacturers of Electric Furnaces and Ovens

For more data circle **532** on Reader Service Card

Overall dimensions of the complete

NOW,
for the
FIRST TIME
. . . a tap specifically for screw machines. Shorter, more rigid shank. Cuts clean and free without "bellmouth." Reduces tap breakage. Lasts longer. Excellent for all machinable metals. Spiral point, high speed steel, ground thread . . . plug or bottoming types. Write for complete information.
STUB SCREW MACHINE TAPS
WIDE RANGE OF SIZES FROM STOCK AT THE PRATT & WHITNEY OFFICE NEAR YOU

For more data circle **533** on Reader Service Card

★ ★ ★ ★ ★

new shop equipment . . .

GUN TYPE DRILLING MACHINE FEATURES SPINDLE SPEEDS UP TO 8,000 R.P.M.

Madison Industries, Inc., Muskegon, Mich., recently introduced a gun type drilling machine. The machine features spindle speeds up to 8,000 r.p.m. with feeds from 0 to 40 inches per minute. It will accommodate gun type drills up to 1 inch in diameter. The workpiece is held stationery with the spindle of the self-contained power unit rotating. It has an air powered, oil controlled feed with either a 6 or 9 inch stroke.

The base of the machine encloses a high pressure coolant system delivering 7.6 gallons per minute at 750 p.s.i. through the spindle of the machine. The system has a 55 gallon tank mounted on casters and hinged to swing out from base for easy access.

View of Madison Gun Type Drilling Machine

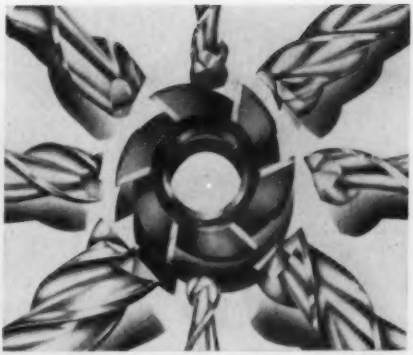
Overall dimensions of the complete unit are 90 by 30 by 63⅞ inches, and the shipping weight is 3,000 pounds.
For more data circle **123** on Reader Service Card

★ ★ ★

STANDARD END MILLS SPECIFICALLY DESIGNED FOR MILLING ALUMINUM

Putnam Tool Co., 2981 Charlevoix Ave., Detroit 7, Mich., now has available a complete line of standard end mills for milling aluminum. Included in this line are 2, 3, 4 and 6 flute designs; square and ball nose types; shell end mills; standard and Postiv-Lok shanks; lengths from 2½ to 11⅝ inches; and diameters from ¼ to 6 inches.

According to the manufacturer, each of these standard end mill designs has been developed through research and experience on aluminum applications.



Putnam Standard End Mills for aluminum

Their correct designs, flutes polished all over, use of fine materials and uniformity are claimed to insure maximum chip removal, long tool life, good finishes, free cutting and all around performance.
For more data circle **124** on Reader Service Card

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HIGH Precision at LOW Cost
THE PRATT & WHITNEY SIGMATIC COMPARATOR . . .
a moderately priced instrument that combines the simplicity and dependability of mechanical gaging with unusual accuracy. Magnification range from 300X to 5000X. Repeatability to millionths of an inch. Self-contained, readily portable. For a wide range of external gaging operations. Ask for Circular No. 599. Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Conn.
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FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle **534** on Reader Service Card

ing type of aircraft tension bolt used

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that insures more accurate work and distributes wear evenly over the entire belt surface is characteristic of P&W Kellerflex Sanding Drums. Exclusive P&W construction of washers that expand rubber core prevents concavity or convexity on the grinding surface. 3/4" to 2" diameters with shanks 2" to 6" with threaded hole.
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NOT
THIS
KELLERFLEX SANDING DRUMS
AVAILABLE FROM STOCK AT THE P&W BRANCH OFFICE NEAR YOU
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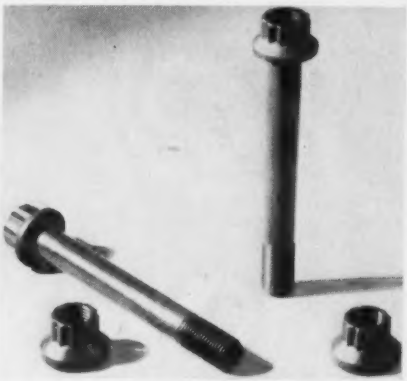
new shop equipment . . .

HIGH TEMPERATURE AIRCRAFT BOLTS

Standard Pressed Steel Co., Jenkintown 22, Pa., recently announced that it is producing fasteners that are claimed to have unusual strength under heat up to 90 degrees Fahrenheit —the friction generated skin temperature of an airplane speeding through the atmosphere at 2,400 miles per hour.

Called Hi Tm 9 Fasteners, they are said to represent a unique combination of strength and temperature resistance. At 900 degrees F., the rated temperature of the bolts, Hi Tm 9 Fasteners have a minimum tensile strength of 170,000 pounds per square inch. The bolts are said to be actually as strong at 900 degrees as many fasteners are at room temperature.

Initial fasteners, designated EWB Tm 9, are 12 point external wrench-



Standard High Temperature Aircraft Bolts

ing type of aircraft tension bolt used for airframe fastening. Diameter sizes range from ¼ inch to 1½ inches.

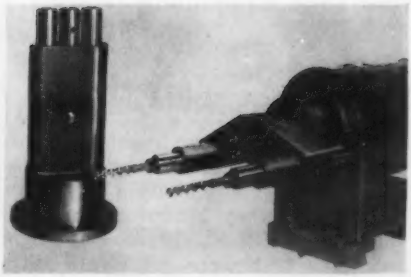
The company plans to make fasteners and related threaded parts with Hi Tm 9 physical properties in any desired configuration—for either tension or shear load applications.

For more data circle **125** on Reader Service Card

★ ★ ★

TWO AND THREE SPINDLE BORING HEADS

Two boring heads have been added to its line of boring equipment by Indiana Foundry, Machine and Supply, Inc., Brazil, Ind. One is a two spindle boring head with centers adjustable from 1 to 6 inches. It is called the Type 126 because of its adjustment range (one to six inches) and will fit all Indiana Horizontal Borers, as well as replace all present adjustable heads. The drills turn right-hand at motor speed.



View showing Indiana Boring Heads

The other is a three spindle head featuring exact 1 inch centers for drilling dowel holes to government specifications. The drills turn at motor speed. Both boring heads feature hardened steel gears and aircraft type ball bearings on all of the rotating parts.

For more data circle **126** on Reader Service Card

★ ★ ★ ★ ★

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FLEXIBLE SHAFT MACHINE

Finest, most dependable machines for burring, filing, sanding, grinding, polishing, wire brushing . . . and many other jobs. Easy to use . . . operator holds only the light handpiece . . . powerful motor is supported by stand. Versatile "Series M" Machines provide 16 speed changes. Available with ⅓ to 1 hp. motors. Convertible stand provides floor stand, bench or suspension mounting.

Write for complete information on KELLERFLEX Burs or Machines. Pratt & Whitney Company, Incorporated, 25 Charter Oak Boulevard, West Hartford, Connecticut

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For more data circle **536** on Reader Sevrice Card

.0003 HOLE LOCATION

new shop equipment . . .

SMALL PARTS BIN STORAGE UNITS

Four models of small parts bin storage units, specifically designed for use on workbench tops, have been introduced by Bathey Manufacturing Co., 100 South Mill St., Plymouth, Mich. Intended to replace makeshift parts storage pans, boxes, trays and dishes, it is claimed that the use of Bathey Bench Bin Units results in conserving working space; making parts instantly accessible; and freeing the workbench surface for production and assembly operations.

These bin boxes hang from rails. They are easily rearranged for parts assembly sequence. The units are said to be particularly useful for benchtop type operations such as service, maintenance, repair and certain assembly operations involving small component parts.

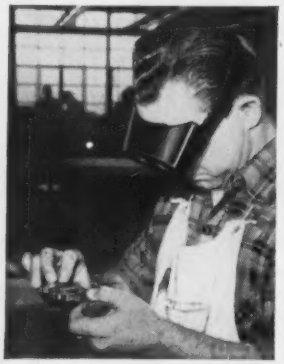
Bathey Small Parts Bin Storage Units in use

Removable bin boxes are offered in five sizes: 6 inches front to back, 2¾ inches deep and in widths from 1¾ to 11⅛ inches.

For more data circle **127** on Reader Service Card

★ ★ ★ ★ ★

People work better when they SEE BETTER®



AT CUTLER-HAMMER

a tool room worker uses the MAGNI-FOCUSER to read a Vernier Height Gauge

MAGNI-FOCUSER

SPEEDS PRODUCTION

With Third Dimensional (3-D) Vision

Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and *prevents squinting*—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

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- JUMPS SIDEWAYS AS SHOWN WHEN LOCATION IS REACHED

←NEW .500 DIA. MODEL FOR LARGER WORK ONLY. .200 DIA.→

ADJUSTABLE VISE STOP

$2.95

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ATTACH TO VISE WITH ONE ¼-20 TAPED HOLE.

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- SPEED WITH ACCURACY NO SECONDARY OPERATIONS
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NIBBLING MACHINE PIONEERS

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How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-make square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

SLEEVES MADE IN FOLLOWING SIZES:

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Write for Literature

For more data circle **540** on Reader Service Card

new shop equipment . . .

AUTOMATIC PUNCH PRESS FEED

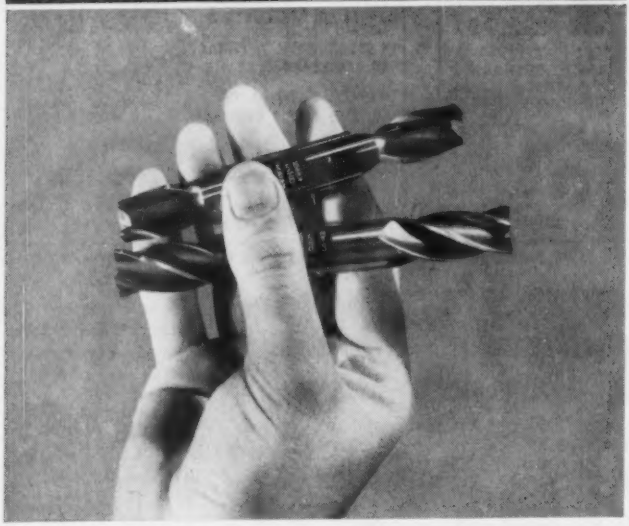
The H. E. Dickerman Manufacturing Co., 321-320 Albany St., Springfield, Mass., has announced a 12 inch Rol-Di-Feed, the latest addition to the company's line of automatic punch press feeds. The 12 inch model is a self-contained, cam driven feed that can be mounted to feed in any direction for any type of die, piercing, blanking, compound, progressive or draw.

According to the manufacturer, the feed is unusually smooth in operation and is completely silent. It will not add to the noise of a busy press room. Being mechanically operated, temperature changes do not affect its accuracy. With the feed and cam properly mounted, it is now ready for operation.

The Rol-Di-Feed requires no connection to the crankshaft of the press and utilizes almost all of the full 360 degrees of press shaft rotation, feeding on the upstroke and also on the downstroke. This arrangement permits stock feeds up to 12 inches per cycle, even on deep drawing or forming dies where only a fraction of the total press stroke is available for feeding purposes.

The unit handles such different materials as paper, plastic, fibre or cold rolled steel in thicknesses ranging from 0.003 to 3/16 inch. Open side design accommodates stock of practically unlimited width.

YESTERDAY'S PIONEER · · · TODAY'S LEADER



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MACHINE RACKS

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This rack is made from special machinery steel finished to our specification . . . cut by expert mechanics on machines designed especially for this work.

Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys, and features a chart for checking machine racks.

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BEAVER FALLS • PENNSYLVANIA
Plants: Beaver Falls, Pa.; Hammond, Ind.

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MORRISON 1" AUTOMATIC KEYSEATER

Investigate the many features of this new Keyseater. It has automatic feed, automatic stop to cut off feed at given depth, automatic relief to back the work away from the cutter, automatic centering, automatic lubrication and no bushings required.
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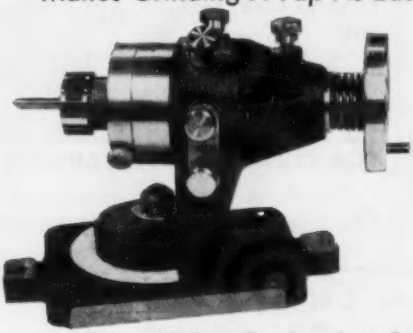
Makes Grinding A Tap As Easy As Sharpening A Pencil!



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HIGH QUALITY PRECISION
TAP GRINDER
Has all the money-saving features of higher priced machines!

LOWEST PRICE EVER!
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- CAN BE USED ON ANY GRINDING MACHINE!
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Write for Bulletin #22

R & A MACHINE CO., Inc.
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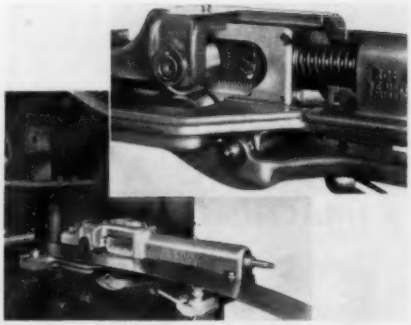
For more data circle **544** on Reader Service Card

new shop equipment . . .

The accompanying illustration shows the 12 inch Rol-Di-Feed conventionally mounted on a punch press. The inset shows the two precision gears, which operate in sequence, feeding one half of stock on the press upstroke, the remainder on the downstroke. At the end of individual forward travel, each gear instantly locks against reverse rotation, preventing any backward movement of the stock being fed.



Dickerman 12 Inch Rol-Di-Feed mounted on a punch press. Inset shows two precision gears feeding one half of stock on press upstroke, the remainder on the downstroke.

Dickerman 12 Inch Rol-Di-Feeds can be mounted on the press bolster (or the die shoe in some instances) to feed from left to right, right to left, front to back, back to front or at any angle.

For more data circle **128** on Reader Service Card

★ ★ ★

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Expert design of internal fulcrumed lever insures leakproof, dependable, care-free service.

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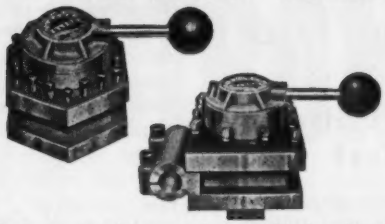

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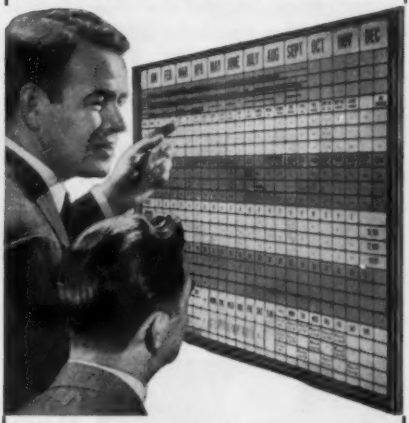

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For more data circle 546 on Reader Service Card

new shop equipment . . .

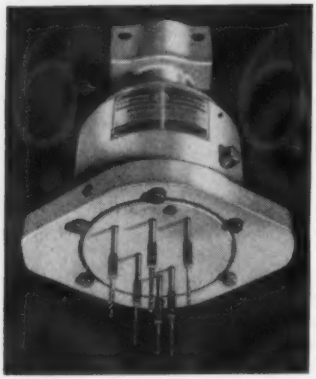
ed a 20 Inch Heavy-Duty Engine Lathe. According to the manufacturer, this lathe has been designed from the ground up to use 40 h.p. effectively—it will permit maximum efficiency with tough ceramic and carbide tools. In the headstock, unusually short, heavy shafts and fine pitch precision ground gears deliver power efficiently to the spindle — with minimum no-load horsepower. There is ample power at low speeds, also. For example, at 10 r.p.m. a cut can be taken as deep as ½ inch in 16 inch diameter work, feeding at 0.063 inch per revolution.

Thirty-six speeds, from 10 to 1,300 r.p.m. in geometric progression, are provided on the LeBlond 20 Inch Lathe. Selections are made in fine increments, particularly in the low range where small differences in r.p.m. make big differences in cutting speed, hence are important factors in tool life. The forged spindle is supported in three places by five bearings. At the apron d.c. speed selection is available with simplified gearing in the head.

In the two speed tailstock, spindle travel is geared for conventional and low speed. When drilling, for instance, the handle is pushed in to drill at slow, powerful feed; the handle is pulled out to retract quickly. The tailstock can be moved by power. According to the manufacturer, the worm and rack construction puts the handwheel at a convenient angle to the operator, provides unusual-

New Series 66 ZAGAR

GEARLESS DRILL HEAD



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√ NEW LOW PRICE

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Do you want to drill profitably up to 6 holes simultaneously? Here's our answer. For less complicated drilling (and tapping) jobs, up to 3½" spread, but for high production, Zagar's "66" fills the bill. Maximum drill diameter —⅝". You'll like both our deliveries and our price.

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(H. S. S. and Carbide)
*THIS ONE for Holes from 1/16" upward
STANDARD AND SPECIAL BORING, FACING & INTERNAL THREADING TOOLS. *Write for Data*
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BUSHINGS

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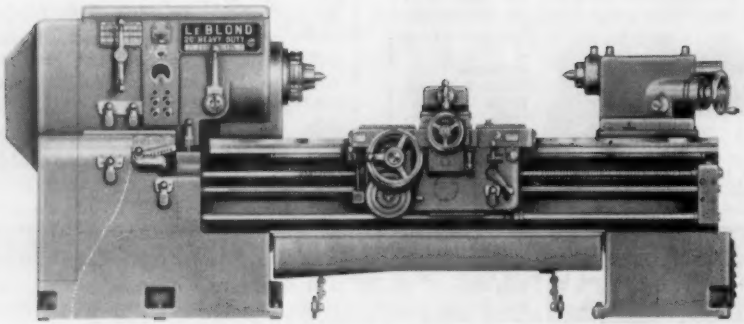
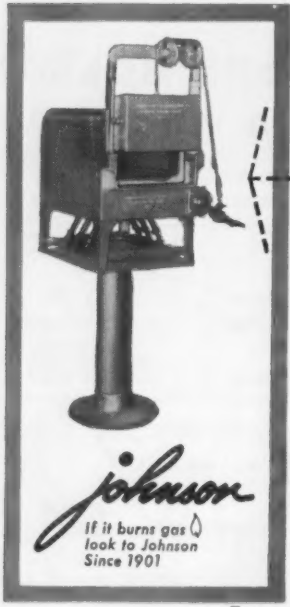


LeBlond 20 Inch Heavy-Duty Engine Lathe has 36 speeds, ranging from 10 to 1,300 r.p.m.

ly long travel and positive safety lock against thrust. The tailstock also provides full length support of the spindle, even when extended.

Other features of the lathe include: hardened and ground replaceable steel bedways with compensating vee way design; automatic lubrication to the head, quick change box, apron, single shot to the tailstock; hardened and

★ ★ ★ ★ ★



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Bench Model _____$287.00
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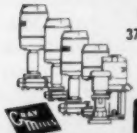

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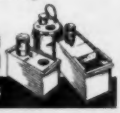

GRAYMILLS
Superflo COOLANT PUMPS AND UNITS

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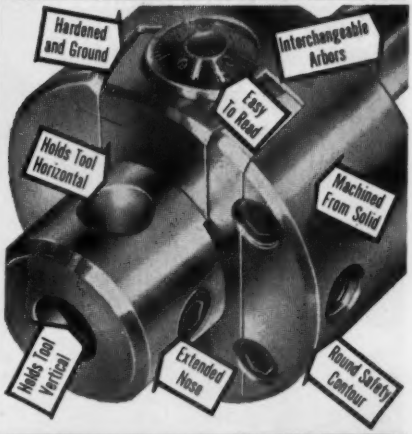
FLYNN BORING HEADS



LEADING NAME IN BORING HEADS FOR 40 YEARS
19 MODELS *Write for catalog*
FLYNN MANUFACTURING CO.
133 FLOWERDALE AVE • DETROIT 20, MICH

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NEW DRILLS FROM OLD WITH NU-TANGS

NU-TANGS CUT DRILL REPLACEMENT COSTS!

We return them like this!

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Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size — and with GUARANTEED ORIGINAL STRENGTH. No welding—No distortion —No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

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NU-TANGS INC. 1335 Bates Street Cincinnati 25, Ohio

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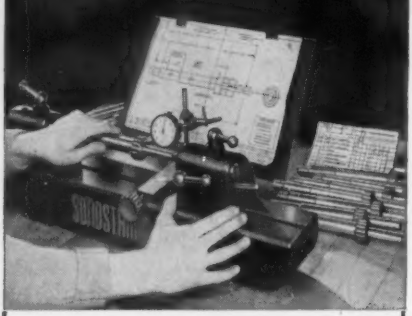


Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

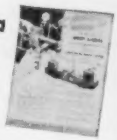
"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 581.



SUNDSTRAND

SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

For more data circle **559** on Reader Service Card

new shop equipment . . .

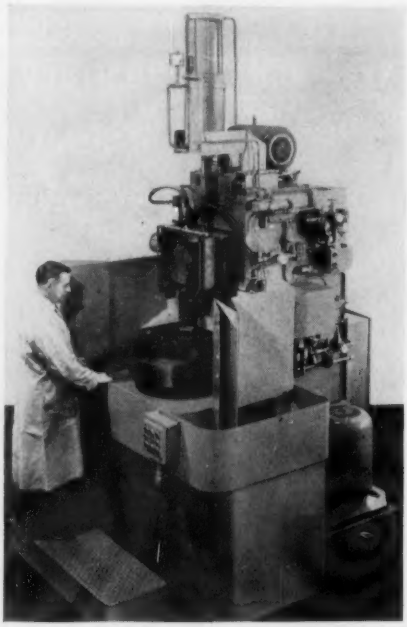
ground crossfeed screw with compensating nut; one piece apron; flame hardened rack; totally enclosed quick change box.

For more data circle **129** on Reader Service Card

★ ★ ★

SINGLE STATION FINISHING MACHINE USES INTERCHANGEABLE HEADS

The BL-1 Series Single Station Precision Finishing Machine has been designed and built by the Hoern and Dilts Division, The New Britain Machine Co., Saginaw, Mich., to perform the following operations: contour turning, boring and facing, straight boring, surface grinding, surface hon-



Hoern and Dilts Precision Finishing Machine

MANHATTAN'S MIRACLES! Top Values . . . Lowest Prices

SHELL END MILL ARBORS

For tremendous savings, write for free circular

HIGHEST QUALITY
Hardened and ground to closest tolerances

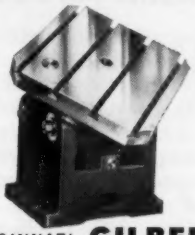
#40 arbors ea. $32.00
#50 arbors ea. $44.00

THREADED HOLE 5/8" 11 N.C., R.H.				THREADED HOLE 1" 8 N.C., R.H.			
No.	A	B	C	No.	A	B	C
40½ C 5/8	40	½	11/16	50½ C 5/8	50	½	¾
40¾ C 5/8	40	¾	11/16	50¾ C 5/8	50	¾	¾
41 C 7/8	40	1	15/16	51 C 7/8	50	1	1
41¼ C 7/8	40	1¼	15/16	51¼ C 7/8	50	1¼	1
41½ C 7/8	40	1½	15/16	51½ C 7/8	50	1½	1
				52 C 7/8	50	2	1

(A)—Spdls. having M.M. Std. Taper Hole, No.
(B)—Diam. of Hole in Shell End Mill, Inches.
(C)—Projection from Spindle End. Inches.

MANHATTAN SUPPLY COMPANY
The Cutting Tool Discount House
151-A Grand St., New York 13 CAnal 6-4992

For more data circle **560** on Reader Service Card



SAVE 50% of positioning time

With one set-up on a Cincinnati Gilbert universal table, you can drill at any angle up to 90° on 5 sides of a cube. Provides maximum support of work piece, assures rigidity and accuracy. Table sizes: 22" and 27" square, 22" high. For complete details and specs, ask for Bulletin 850.

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

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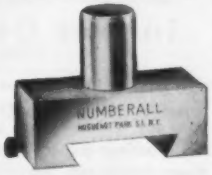
NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

IMPROVED TYPE HOLDERS for stamping into Metal, etc.

STEEL TYPE

DOVETAIL ADAPTER Model No. 116



Hand or Press Style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to ½" figures and letters. Write for Bulletin MS23H.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

SINGLE or MULTIPLE LINE TYPEHOLDERS with Dove Tail Shank allow *Quick Changing* of Type without taking holder out of the Press. *Write for Bulletin MS 116*

For more data circle **562** on Reader Service Card

new shop equipment . . .

ing, i.d. grinding, o.d. grinding, contour milling and horizontal or straight milling.

Designed for jobs requiring rough and/or precision finishing operations, the machines utilize the standardized, cam actuated heads developed for the Hoern and Dilts Multi-Station Finishing Machines. The application of these interchangeable heads to a single station machine is said to make available single, completely automatic cycles of operation.

The BL-1 Series is available in single or double spindle models and with single, multiple or variable spindle speed drives. Motor drives from 3 to 20 h.p. per spindle are available. Cross slide travel is 5 inches; longitudinal slide travel is 6 inches.

Other machine features include: rapid slide traverse during idle time; vertical spindles for easy loading and accurate seating of parts in chuck; wide open, easily accessible tool area; generous chip space; and optional high lift slides for loading of extra large pieces.

For more data circle **130** on Reader Service Card

★ ★ ★

MACHINE AUTOMATICALLY PRODUCES AND INSPECTS 720 ASSEMBLIES PER HOUR

An eight station automatic assembly machine, designed and built by Omer E. Robbins Co., 24800 Plymouth Rd., Dept. B, Detroit 39, Mich., automatically performs multiple operations including press fit inspection on automatic transmission gear carrier assemblies.

Four pinions, with needle bearings and spacers for each, are previously assembled into the gear carrier and

the **ARC-TWIN** *Cuts Two Perfect Notches*

in *One* Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from ½" to 2⅜" O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.

PATENTED

Ask for twin-notched sample of pipe or tubing

VOGEL TOOL AND DIE CORPORATION 1823 North 32nd Avenue Melrose Park, Illinois

For more data circle **563** on Reader Service Card

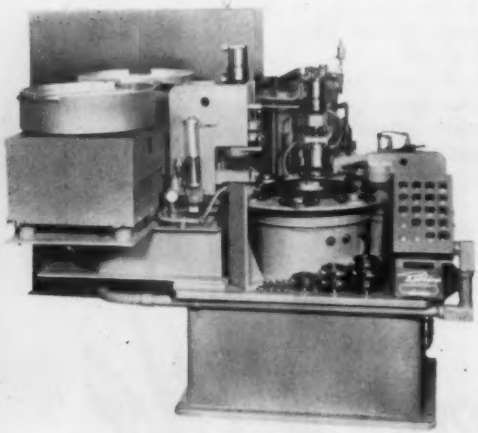
held in place with dummy pins. These assemblies are manually loaded into the machine. At the first station permanent pins are fed from two vibratory hoppers, shuttled into position and pressed into the assembly, forcing out the dummy pins. The next station checks the press fit of each pin, automatically informing a built-in memory circuit in the electrical system if a pin does not resist a predetermined pressure. This memory circuit causes defective assemblies to be ejected automatically at the next station. Acceptable assemblies continue without interference through this station to the next, where the pins are staked at each end in order to make a permanent assembly.

Fixtures float freely over the index table and ride up on stationary anvils at the operating stations, thus eliminating pressure on the index table. Positive alignment is claimed to be assured at each station by hardened locating pins, which pick up locating bushings in the fixtures. In addition to automatic and manual start and stop buttons, the control panel has buttons which control individual machine movements, as well as offering forward and backward inching control of the table. A red light located on the panel flashes whenever an assembly is rejected.

All stations on the machine are hydraulically operated and have complete electrical interlock. Hydraulic and electrical equipment conform to

faster delivery
FROM YOUR LOCAL
INDUSTRIAL DISTRIBUTOR'S STOCK
ACME
ACME
Dowel Pins
● Standard PINS available in lengths from 3/8" to 6"—1/4" to 1" in diameter. Specials, including pins of stainless steel, quoted on request
● Precision pins, hardened and ground to .0002" or .001" over nominal diameter—also available: .002", .003", .004" and .005" oversize—all diameters .0001"
● Acme Pins are case hardened to 60-62 Rockwell "C" scale and a core hardness of 36-38
● Acme Pins will break before bending or mushrooming
Write for information and prices on standard and oversize dowel pins
ACME INDUSTRIAL COMPANY
204 N. LAFLIN ST. • CHICAGO 7, ILLINOIS • MOnroe 4-4122
For more data circle 564 on Reader Service Card

new shop equipment . . .



Omer E. Robbins Automatic Assembly Machine performs multiple operations

J.I.C. standards. The machine is normally cycled to complete 720 assemblies per hour at 100 per cent efficiency with manual loading.

For more data circle 131 on Reader Service Card

★ ★ ★

TRACER LATHE AUTOMATICALLY TURNS MULTIPLE DIAMETER SHAFTS

The unique design of the Cincinnati Hydraguide Tracer Lathe, built by Cincinnati Lathe and Tool Co., 3207 Disney St., Cincinnati 9, Ohio, provides automatic turning of multiple diameter shafts and contoured workpieces, while retaining the versatility of a standard lathe.

The tracer mechanism is instantly put into operation by a single pushbutton. When manual usage of the lathe is desired, none of the tracer mechanism need be removed. The

★ ★ ★ ★ ★

NOW! LATHE USERS CHANGE TOOLS in a ... FLASH ..

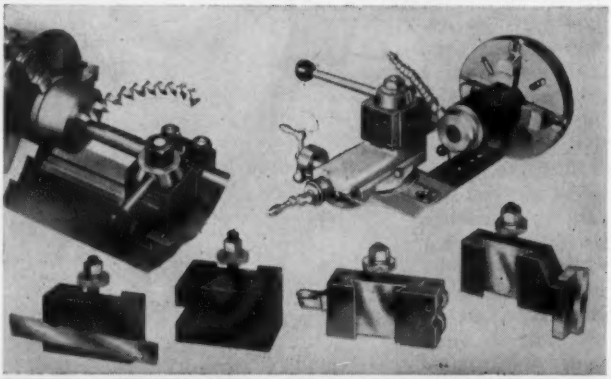
ALORIS QUICK CHANGE TOOL POSTS & HOLDERS

Speed Your Operation . . . . Save You Money

Only a second to change tools for turning, facing, drilling, boring, threading, knurling, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
- RUGGED CONSTRUCTION.
- TESTED AND RECOMMENDED BY LEADING LATHE MANUFACTURERS.
- GREATER RIGIDITY.
- SAVES 90% IN SET-UP TIME.
- UNCONDITIONALLY GUARANTEED.

Write for catalog and price list.



ALORIS TOOL CO., INC. 131-37 SANFORD AVENUE FLUSHING 55, N. Y.

For more data circle 565 on Reader Service Card

tracer is locked out merely by retracting the tracer slide and pushing a single control button.

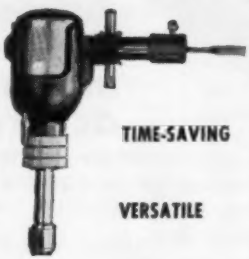
Engineered for convenience and operator safety, the entire tracer mechanism is mounted on the carriage with all controls, template, tracer finger and tools on the operating side of the lathe. This compact design requires no additional floor space, yet it does not interfere with standard lathe operations. In addition, it provides short hydraulic linkage, insuring maximum sensitivity in tracer control.

The Hydraguide will automatically turn multiple diameter shafts, shoulders, tapers, necks and contours. It can also be employed for boring and facing operations.

The all hydraulic tracer control is claimed to be unusually sensitive, and will accurately reproduce the template shape without need for special operator skill. The swiveling tracer is normally set at a 45 degree angle to the center line of the lathe. This permits the machining of square shoulders at high feed rates without interruption of lateral carriage movement.

Hydraguide Tracer Lathes are built in 15 and 18 inch swing sizes, and a wide variety of center distances from 30 to 114 inches. Motor size has been increased to 5 h.p. Clutch drive is standard. Twelve spindle speeds in geometric progression from 37 to 1,470 r.p.m. can be instantly selected by three lever, direct reading, color-match dials. Forty-eight thread and feed changes afford a carriage feed range

THE
Di-Profiler RECIPROCATING HAND MACHINE
does your job faster



TIME-SAVING

VERSATILE

ADAPTABLE

For precision cutting, roughing, finishing of tools, dies, molds. For straight, or irregular surfaces, convex or concave curves—also shoulders, recesses and hard-to-get-at or intricate detail.

Saves hours of tedious hand labor in grinding, filing, scraping, honing or polishing. The reciprocating speed is variable from 0 to 100 strokes per second; and the stroke is adjustable from 0 to 6 mm. (1/4 inch). Sturdily built, the Di-Profiler is light; free from vibration.

A complete assortment of efficient accessories and tools is available for every type of work: steel and diamond files, diamond discs, laps, hones, T-C scrapers; also rotary tools including diamond wheels, burrs and points.

Investigate the Di-Profiler —a minor investment that assures savings of time and costs. Ask for a demonstration of price list S-77.

ENGIS EQUIPMENT COMPANY
Sole authorized distributor for the U.S.
431 S. DEARBORN ST., CHICAGO 5, ILL.

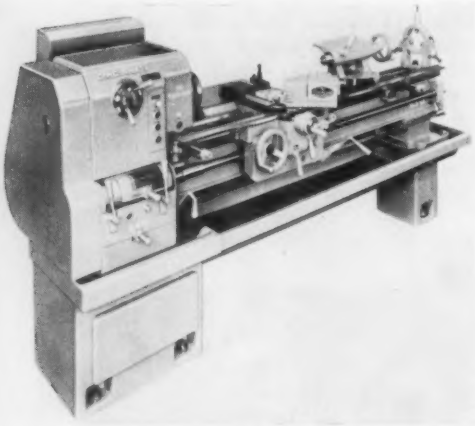
For more data circle 566 on Reader Service Card

price list.

FLUSHING 55, N. Y.

For more data circle 565 on Reader Service Card

new shop equipment . . .



View of Cincinnati Hydraguide Tracer Lathe

from 0.0019 to 0.1215 inch per spindle revolution, and a thread range of 1½ to 92 threads per inch with provision for quick conversion to metric threads.

For more data circle **132** on Reader Service Card

★ ★ ★

37 TON BACKGEARED PRESS

The Press-Rite Division, Sales Service Machine Tool Co., 2355 University Ave., St. Paul 14, Minn., has announced a 37 ton open back inclinable backgeared press. Operating at approximately 45 strokes per minute, the press is said to be ideal for dial feed or other automatic feed equipment which may be added while at the factory or after the press has been installed in a shop.

Designed for drawing parts and other backgeared applications, the press has heavy reinforced Unicast alloy frame and 3¼ inch diameter crankshaft with bronze main bearings. Roller bearings in the flywheel and

ROOFE STANDARD TYPE Live Centers

assure maximum accuracy!

Users everywhere say: "ROOFE Live Centers increase production, lower costs, and give tops in accuracy."

Made of the finest alloy steels, standard types are available in Morse Taper, Brown & Sharpe, Jarno, straight or special shanks, to your specifications.

Write for our catalog.

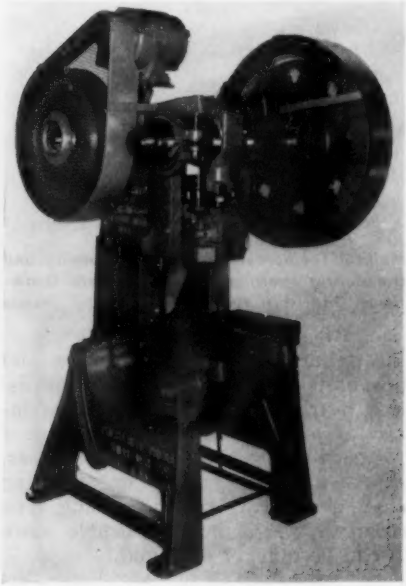
HOUSTON GRINDING & MFG. CO., Inc.

P. O. BOX 7461 • HOUSTON 8, TEXAS

For more data circle 567 on Reader Service Card

movement.

For more data circle 566 on Reader Service Card



Press-Rite 37 Ton O.B.I. Backgeared Press

on the back shaft press have a 14 by 25 inch bolster.

The standard stroke is 2½ inches and, if desired, can be arranged for up to a 4 inch stroke. The standard shut height is 10 inches and the press may be arranged for shut height up to 20 inches.

An interesting feature of the Press-Rite 37 Ton Backgeared Press is that the back shaft bearing supports are an integral part of the frame. The manufacturer claims that this type of construction provides great strength and long life.

For more data circle 133 on Reader Service Card

★ ★ ★

TOOLHOLDER COMBINES THROW-AWAY WITH SLUG TYPE INSERTS

For operations where grooving is to be combined with such operations as

Better Service on STAMPINGS is as simple

as

A FEW PIECES —at Experiment or Pilot Stage 1

NO DIES! Our machine cut method, applying custom-built slitters, cutters, saws, files and stock punches—PLUS special techniques and skills—produce these small quantities at very low cost.

SHORT RUNS 2

TEMPORARY LOW-COST TOOLING! To produce something more than a few, but less than high production quantities, our simple contour dies—PLUS special purpose presses—keep costs low.

HIGH RUNS 3

MODEST DIE CHARGES on larger quantities! Here is where our regular production toolings apply to advantage ...to deliver high quantity Stampings, and at lowest possible unit cost.

You can rely on it...we look at all 3 Stamping techniques, each our exclusive development...to determine the best method for fast, efficient, low-cost Service on any quantity—one to a million!

Free 12-page booklet shows how to save on stampings...write for it.

LAMINATED SHIM COMPANY, INC. STAMPINGS DIVISION

3307 Union Street, Glenbrook, Conn.

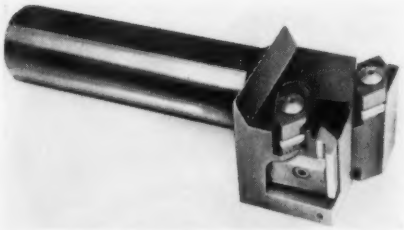
For more data circle 568 on Reader Service Card

P. O. BOX 7461 • HOUSTON 8, TEXAS

For more data circle 567 on Reader Service Card

new shop equipment . . .

turning or chamfering, The Wesson Co., 1220 Woodward Heights Blvd., Detroit 20, Mich., is offering the Wesson Multicut Toolholder, shown in the accompanying illustration, which employs both slug type (on end) and throw-away type inserts. Two of the



Multicut Toolholder for grooving, turning and chamfering operations combines both throw-away and slug type Wesson metal inserts

inserts are square throw-aways and are used for chamfering a transmission gear in two places. The other insert is of the slug type and is used for cutting a groove in the same gear. Since wear is greater on grooving than chamfering tools, the slug type insert is particularly desirable since it can be quickly reground.

For more data circle 134 on Reader Service Card

★ ★ ★

PROFILING TOOL FOR CONTOURING MACHINES

A throw away insert profiling tool for contouring machines has been developed by Kennametal, Inc., Latrobe, Pa. This Kendex-Profiling Tool was designed to prevent the insert from shifting. A rigid support and clamp hold the insert in proper cutting position when the direction of cutting force

Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS
Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to ¾" U.S.S. Inexpensive — Last for years.

Write for Circular
NIELSEN TOOL & DIE COMPANY
P. O. Box 1067
Berkley, Mich.

For more data circle 569 on Reader Service Card

AUTOM

CONTINUOUS HINGES
Manufactured by
AUTO MOULDING & MFG. CO.
WRITE FOR CATALOG
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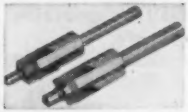
Now . . . carried in stock . .



AND 10050 Porting Tools

A complete line of carbide tipped combination ream, counter-bore and facing tools to machine standards. Combines 5 operations in one tool! Thoroughly proven.

WETMORE TOOL & ENGINEERING CO.
5320 E. WASHINGTON BLVD., LOS ANGELES 22, CAL.

For more data circle 571 on Reader Service Card

be combined with such operations as

3307 Union Street, Glenbrook, Conn.

For more data circle 568 on Reader Service Card

changes, as in plunge or face-out cuts.

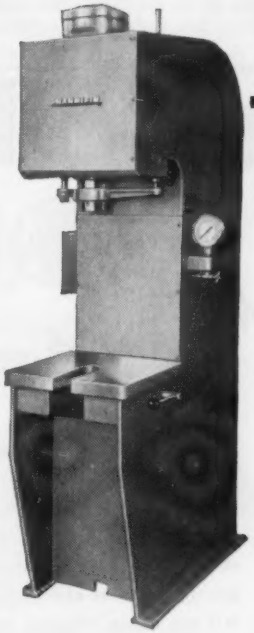
The tool assembly includes a chip breaker plate, indexable insert and insert seat, all solid carbides of different grades. Inserts are of two general types, right and left-hand, and have two indexable cutting edges with a positive rake angle that minimizes power requirements and tool pressures and, thus, assures accurate duplications of shapes, it is claimed.

Chip breaker plates have high strength and assure continuous chip flow. They are claimed to control chip flow over a wide range of feeds and depths of cut, and eliminate chip breaker grinding. Insert seats have an offset to provide a hard back-up surface that will not mush out or permit the insert to shift under heavy cuts.

Holders, consisting of hardened alloy steel shank and clamp, are avail-

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES



1-TON, Bench Type	$ 605
2-TON, Bench Type	$ 680
5-TON, with Base	$1,530
8-TON, with Base	$1,605
10-TON, Floor Type	$2,290
25-TON, Floor Type	$3,790

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

HANNIFIN

HANNIFIN CORPORATION, 565 S. WOLF ROAD, DES PLAINES, ILLINOIS

For more data circle 572 on Reader Service Card

1114 E. 87TH ST. CHICAGO 19

For more data circle 570 on Reader Service Card

WETMORE TOOL & ENGINEERING CO.
5320 E. WASHINGTON BLVD., LOS ANGELES 22, CAL.

For more data circle 571 on Reader Service Card

new shop equipment . . .

Kendex Throw Away Insert Profiling Tool

able in three types and 18 sizes for all modern profiling machines.

For more data circle 135 on Reader Service Card

ANGLE IRON SHEAR IS HYDRAULICALLY OPERATED

The W. A. Whitney Manufacturing Co., 640 Race St., Rockford, Ill., recently introduced a hydraulically operated angle iron shear. This shear, which is operated by foot treadle and by means of a two way selector valve, can be used in conjunction with the No. 95 Hydraulic Press manufactured by the company. The blade is under the complete control of the operator at all times. It can be lowered, stopped or raised at will. The complete cycle time is six seconds, with a 3 h.p. motor. Side thrust blocks are said to prevent misalignment of the blade and die, or wear to the cylinder wall.

The shear has a capacity of 4 by 4 by ¼ inch angle iron, ⅜ by 3½ inch

You Can Rely on a ROUSSELLE

THESE 40-TON PRESSES take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are *very moderately priced.*

Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

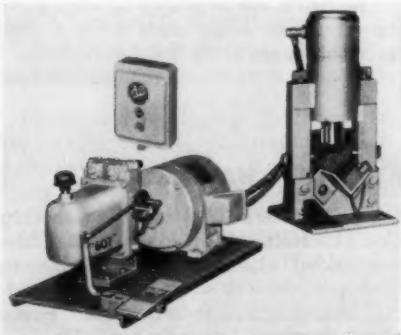
Choice of 25 models in 5 to 40-ton sizes.

Manufacturers of Rousselle Presses

SERVICE MACHINE CO. 2310 West 78th Street • Chicago 20, Ill.

For more data circle 573 on Reader Service Card

HANNIFIN CORPORATION, 565 S. WOLF ROAD, DES PLAINES, ILLINOIS
For more data circle 572 on Reader Service Card



Whitney Hydraulic Operated Angle Iron Shear

flat, ⅝ inch round, ½ inch square bars or 1 inch hollow square tubing with the regular angle iron shear blades. According to the manufacturer, there is no distortion to the ends of the bars.

Additional blades are obtainable to shear 5/16 by 6 inch flat stock, or bending dies to form right angle bends in round and square, or up to ⅜ by 6 inch flat stock. Dies and inserts are also available to shear various sizes of channel iron.

This will be a useful tool for the ornamental iron trade, with unlimited possibilities for general work in sheet metal shops, steel fabricators, ship yards, electrical contractors and maintenance departments, as well as electric sign manufacturers.

For more data circle 136 on Reader Service Card

★ ★ ★

TUNGSTEN DRILL

Air Transport Equipment, Inc., Albany Ave., Amityville, N. Y., recently introduced a line of British made tungsten drills. These drills are manufactured in Sheffield, England, of 18 per cent tungsten "Qualcut" steel. The flutes are ground, lapped and polished

★ ★ ★ ★ ★
COLLINS
MICROFLAT®

BLACK GRANITE

• SURFACE PLATES
• ANGLE PLATES
• STRAIGHT EDGES
• LAYOUT PLATES
• PARALLELS
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COLLINS MICROFLAT surface plates and precision accessories offer the user extreme accuracy —flatness in millionths!

All sizes—
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CHECK DESIRED ITEMS AND MAIL WITH YOUR NAME & ADDRESS
COLLINS MICROFLAT COMPANY, INC.
3249 W. El Segundo Blvd. Hawthorne (Los Angeles County), Calif.
Phone: OSborne 5-4436

For more data circle 574 on Reader Service Card

Tungsten Drill has polished flutes

for free cutting-cool chips. Long stage heat treatment is claimed to assure tool toughness together with long life.

The drills are available in wire gage sizes 1 to 80, letter sizes A to Z and fractional sizes from 1/64 to ½ inch.
For more data circle **137** on Reader Service Card

★ ★ ★

ALUMINUM HAND KNOBS

Northwestern Tool and Engineering Co., 119 Hollier Ave., Dayton 3, Ohio, has added aluminum hand knobs to its line of products. The knobs are available in a Star Type with through tap or ream and a Hexagon Type with blind tap or ream. Each type is available in several different sizes. The aluminum hand knobs are claimed to have a minimum tensile strength of about 20,000 pounds per square inch.
For more data circle **138** on Reader Service Card

(Above) Northwestern Star Type Hank Knob; (Below) Hexagon Type

Star Performers
COAST-TO-COAST
Time SAVING!
Wheel SAVING!
Tool SAVING!
STANDARD CARBIDE TOOL GRINDERS
STANDARD builds a carbide tool grinder for every job "in the book" . . . grinders time-tested by industry for 4 decades! Ask for Literature
the STANDARD electrical tool co.
Since 1912
GRINDERS AND MACHINE TOOLS
2487 RIVER ROAD
CINCINNATI 4, OHIO
Type 14 TD Wet or Dry Twin Wheel Carbide Tool Grinder 6"-10" & 14" Wheels
TWIN WHEEL TOOL GRINDER
NEW WAY
One step from rough to finish grind. Conserve floor space—place grinder against the wall.
Type 10 T Wet or Dry Single Wheel Tool Grinder 6"-10" & 14" Wheels
Type 67 Vari-Tool Finisher 6" Wheel With Abrasive Belt
STANDARD
HALLMARK OF METALWORKING THROUGHOUT THE WORLD

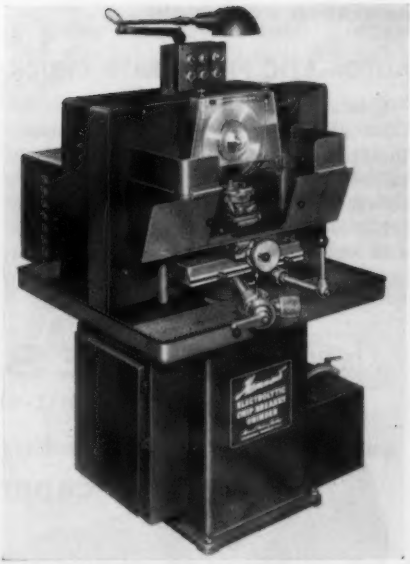
For more data circle **575** on Reader Service Card

CHIP BREAKER GRINDER FOR 6 AND 10 INCH DIAMETER WHEELS

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich., recently announced an Electrolytic Chip Breaker Grinder for 6 and 10 inch diameter wheels. This grinder is said to provide smooth, fast, single pass, full depth grinding. The spindle is extra heavy and dynamically balanced with precision fitting and is furnished with large and preloaded duplex ball bearings. A tapered spindle nose is said to assure true wheel mounting.

The table reciprocates on hardened and ground ball bearing ways and the Any-Angle Vise accommodates tools up to 2½ inches wide. Another feature is a built-in MistKolector, which returns the captured coolant to the pump and tank unit in the base.

For more data circle **139** on Reader Service Card



Hammond Electrolytic Chip Breaker Grinder

The ONLY Live Center On Which Points May Be Interchanged to ±.0001

Points Must Be Ordered With LIVE CENTER To Achieve This Degree Of Accuracy.

Empire Live Centers

Quality engineered for use on lathes, grinders, and milling machines . . . Empire Live Centers are versatile, accurate, heavy duty. Tapered seats give consistent precision alignment . . . assure accuracy of .0001. Positive seal eliminates dirt, grit, cutting oils. Combination bearings absorb both radial and thrust loads.

Manufactured in all tapers: Morse, Brown & Sharpe, Jarno, and straight shank. Special shanks and points to order.

Empire Toolmaker's Set available in handrubbed American Walnut case.

Ask your local distributor or write direct for 26-page Catalog on Live Centers, Collets, Internal Collets, Draw Bars, and Turret Tool Posts.

ROYAL PRODUCTS

ROYAL PRODUCTS, 84 Union Street, Mineola, L. I., N. Y. Ploneer 6-4245

For more data circle **576** on Reader Service Card

new shop equipment . . .

AUTOMATIC PINCH JAW CHUCK

Cushman Chuck Co., Hartford, Conn., has designed an automatic pinch jaw chuck for use on vertical or horizontal spindle machines. This chuck has been developed especially for chucking parts of large diameter and small cross section without strain or distortion, while being machined to unusually close tolerances. The manufacturer claims that this results in increased production with subtantially reduced set-up time.

The Cushman Automatic Pinch Jaw Chuck is comprised of a chuck body with multiple pinch jaw units and three self-centering master jaws. Each pinch jaw and the centering unit, containing the master jaws, are operated by self-contained reversible type air motors, with necessary valving and regulating controls for full operation located in a small area at the chuck periphery.

Operation of the chuck is simple, as the air supply is provided by a quick connect coupling which is disconnected after set-up. The chuck is divided into three separately controlled units; the self-centering unit and the two groups of opposing pinch jaws. Each of these units has two air valves which control movement direction. To chuck a workpiece, the operator actuates one valve to center the part, another valve to operate one set of pinch jaw units, and a third valve to actuate the remaining pinch jaw units.

Pinch jaw units are of the floating

CHICAGO® DREIS & KRUMP
PRESSES
STRAIGHT-SIDE TYPE
with large die area capacities up to 400 tons
AND
GAP TYPE PRESSES

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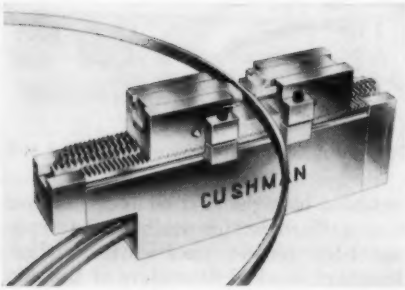
Complete recommendations for any job on request
CHICAGO DREIS & KRUMP
Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines
DREIS & KRUMP MANUFACTURING CO.
South Loomis Boulevard, Chicago 36, Illinois
For more data circle 577 on Reader Service Card



Cushman Automatic Pinch Jaw Chuck

or compensating design, adjusting themselves automatically with the slightest resistance to the gripping surfaces of the workpiece. A maximum pinch of over 2,000 pounds at 85 p.s.i. is said to be possible for each pinch jaw unit. A non-lift feature has been incorporated into the design which is said to eliminate time consuming checks and/or adjustments previously required. The manufacturer states that tests have shown that the amount of lift is held to less than 0.0002 inch per pinch unit.

For more data circle **140** on Reader Service Card

★ ★ ★

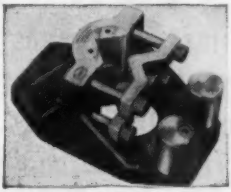
HELICAL CARBIDE TIPPED END MILL

A series of helical carbide tipped end mills, capable of high feeds and speeds in many applications, is now available from stock from Goddard and Goddard Co., Detroit 23, Mich. They have helical carbide cutting edges formed by a special process that produces a true helix with a constant positive rake for the entire length of the tooth face. These features are said to permit higher feeds and speeds when milling cast iron and light metal alloys, for which the tools were pri-

LASSY

WORK HOLDER

Provides quick accurate set-ups on Lathes, Grinders, Jig Borers, Milling Machines and Drill Presses.



Model R Shown **$49.00**

Model P with quick acting swing clamp is ideal for production **$67.00**

RUGGED DESIGN, SUSTAINED ACCURACY

GUARANTEED TO .0005

Hardened steel interchangeable inserts.

Write for free literature.

LASSY TOOL COMPANY

Plainville, Conn.

For more data circle **578** on Reader Service Card

SPELLMACO "SPOTTERS"

A matched set of transfer punches for toolmakers, machinists and tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes 3/32" to 1/2", by 1/64"—plus handy 17/32" size. Length 4 7/8". ONLY $17.90.

Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

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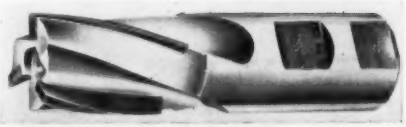


Goddard & Goddard Carbide Tipped End Mill

marily designed. However, they can be used also for light cuts in the milling of steels under good conditions of rigidity, feed and speed.

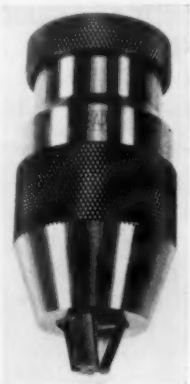
The combination of positive rake and true helix provides rapid chip disposal and freer cutting action, thereby promoting long tool life. The cutters have straight shanks flatted for set screws. Carbide tips are brazed to special high tensile steel cutter bodies. Standard stocked diameters of the end mills range from ⅜ inch to 2 inches.

For more data circle 141 on Reader Service Card

★ ★ ★

DRILL CHUCK

Karl A. Neise, 404 Fourth Ave., Dept. MMS, New York 16, N. Y., recently added to its line of Modern Tools a Swedish precision drill chuck called The Rapid. Each part of The Rapid



The Rapid Swedish Precision Drill Chuck

CUT THESE 5 COSTS IN YOUR PLANT

Machine-installation cost — cut 70%
Plant-layout-change cost — cut 90%
Production-labor cost — cut 20%
Rejects — cut 100%
Tool-change time — cut 80%

These proved savings are being gained by such companies as Inland Steel Products, American Type Founders, Johnson & Johnson, The Colorado Fuel & Iron Corp., Wyman-Gordon, Reed-Prentice, Bullard Company, and many more.

How? By using Barry Leveling Machinery Mounts to make production machinery mobile and to protect machines and buildings from damaging vibration.

FREE! "Proof-of-performance" Reports give details of savings gained in large and small plants. Write **now** for your copies.

BARRY CONTROLS INCORPORATED

BARRY B MOUNT

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

783 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS

For more data circle 580 on Reader Service Card

Drill Chuck is hardened and precision ground.

The Rapid is an automatic tightening chuck, without key. There is said to be no slipping and chewing up of the drill shank. Opening the chuck after operation is easy even after the heaviest cutting because of the ball bearing construction. The spindle and bearings are protected against dirt.

For more data circle **142** on Reader Service Card

★ ★ ★

CUT-OFF MACHINE CUTS AND DEBURRS AUTOMATICALLY

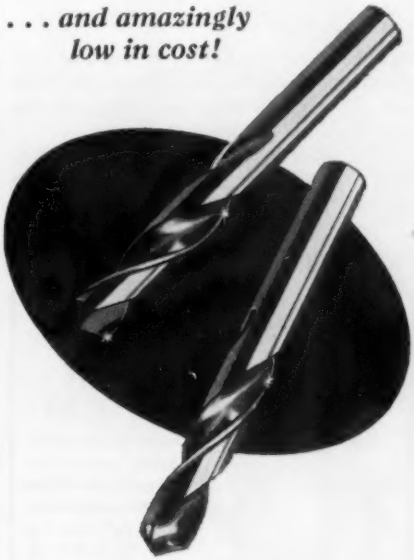
Straight, tapered and step metal tubes can be deburred and cut automatically with a cut-off machine developed by Continental Machine Co., 1952 North Maud Ave., Chicago 14, Ill. This Model No. 3D is said to cut a minimum of 5,000 tubes that are tapered from the middle, producing a total of 10,000 or more tapered legs per day. Tubes are automatically fed to the drilling heads that deburr, face and drill any hole size desired in the leg ends.

Both drilling heads are adjustable for tubes from 9 to 36 inches and 1 to 1½ inch diameters. This basic de-

Continental Model No. 3D Cut-Off Machine

They're tough, they're versatile

. . . *and amazingly low in cost!*



ACE

STUB DRILLS

The short, heavy duty flutes of Ace Stub Drills are ground into top quality pre-hardened high speed steel to give you keener cutting lips, extra strength, longer drill life. Ideal for close-to-work screw machine operations and portable drilling. And they're now stocked in 140 standard sizes that cost approximately 20% less than equivalent jobber length drills!

Call your local Ace Drill Distributor today!

ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

For more data circle **581** on Reader Service Card

For more data circle 580 on Reader Service Card

new shop equipment . . .

sign may be altered to fit various applications, lengths and diameters. The cut-off machine may be easily set for center or off-center cuts.

The operation sequence is as follows: tubes are gravity-fed from a loaded hopper, clamped, both ends drilled and faced, fed into the cut-off machine by a short conveyor, and cut in half to produce two legs or lengths.

The company produces special machines to fit customers' requirements, as well as air and hand operated rotary pipe and tube cut-off machines with capacities ranging up to 12 inches in diameter.

For more data circle **143** on Reader Service Card

★ ★ ★

ROUND HIGH-SPEED BARS SUPPLIED WITH AN IMPROVED FINISH

Crucible Steel Co. of America, Chamber of Commerce Bldg., Seventh Ave. and Smithfield St., Pittsburgh 30, Pa., has announced that all orders for round Rex High-Speed Bars will be supplied with an improved type of finish.

Through the installation of new equipment needed to meet the exacting requirements of its customers, Crucible has made it possible to produce an improved finish on round high-speed steel in sizes ¼ inch round and larger.

This new finish is claimed to offer the consumer the advantage of uniformity from bar to bar, close tolerances and some weight saving.

For more data circle **144** on Reader Service Card

KEO

WOODRUFF KEY SEAT CUTTERS

High speed steel. Arbor type. Correct dimensions for Woodruff Keys, with 1/32" oversize O.D. to permit resharpening. Regularly furnished without clearance on side teeth.

For quality, price and service investigate Keo combined drills and countersinks, T-slot cutters, center reamers and lathe mandrels. Big stocks for fast delivery.

WRITE, WIRE OR PHONE
for Illustrated literature
Jobbers' Inquiries Invited

KEO CUTTERS
19326 Woodward - Detroit 3 Mich.

For more data circle **582** on Reader Service Card

NON-ROTATING SPINDLE BLADE TYPE MICROMETERS

For Measuring of narrow depth grooves, slots, keyways, splines, square threads, recesses and similar "hard-to-measure" surfaces.

Minute micrometer movements without damage to fragile surfaces

Available Carbide-tipped

BLADE THICKNESS .030" GAGING DEPTHS TO ¼"
Spindle and Anvil Blades are hardened, ground and lapped to contact fit

Graduated in .001"
Ranges:
0-1", 1-2", 1½-2½", 2½-3½", 3½-4½" and others

Sold thru Tool Supply Houses

NON-ROTATING SPINDLE BLADE TYPE MICROMETER HEAD

...to be built into fixtures, machine tools, delicate instruments and cross-slides.

WRITE FOR ILLUSTRATED FOLDER Code-GIPUX

GEORGE SCHERR CO., INC. 200-MM LAFAYETTE STREET • NEW YORK 12, N. Y.

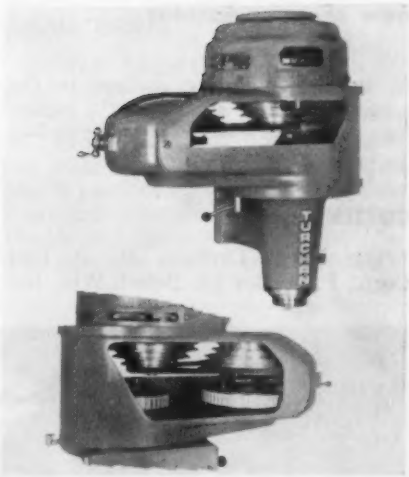
For more data circle **583** on Reader Service Card

MILLING SPINDLE

Equipped with a specially designed belt arrangement, Turchan Follower Machine Co., P. O. Box 6055, Dearborn, Mich., has introduced a spindle drive which offers a wide range of speed and power. Since there are no gears, the unit is quiet and the belts are easily and quickly removed or adjusted to change speed ratios. Large super precision bearings are said to assure accuracy and durability and the axial air gap type motor saves space and reduces weight. The speed range provides a wide variety of work speeds, including extra heavy cuts in tough metals.

Belt tension adjustment is simple and convenient, and a simple brake arrangement stops and holds the spindle for the fast changing of tools.

The specifications are as follows: spindle speeds—130, 195, 300, 460, 705, 1,060, 1,640 and 2,500; spindle nose No. 40 National Standard MM Taper; drive 2 h.p., 1,200 r.p.m. motor; overall dimensions — height is 29 inches, width is 14 inches and the length is



Turchan Milling Spindle contains no gears

ELECTRIC FURNACES
custom designed or standard models
at practical prices

Dyna-Bar High Temperature Furnace

Dyna-Trol Furnace

- Temperature Range—Dynatrol to 2300° F. Dynabar to 2850° F.
- Dynatrol models—from $90.
- Zone/temperature control.
- Pyrometer selector switch for zone temperature indication.
- Patented Element Holders for quick element changing, low heat input requirements and fast recovery time.
- Automatic hold and cutoff instruments at modest additional cost.
- Infinite variety of time-temperature curves.
- Doors—hinged or vertical sliding.
- Circulating fans available in Dynatrols—models to 1850° F.
- Rugged Construction
- 83 standard models
- Firing chamber sizes up to 40" x 36" x 72".

Need a special furnace or oven for glass or metal annealing, atmosphere work, extra high temperatures (to 3200°)? Tube or drawing furnaces, Moly-wound furnaces? We'll quote you promptly.

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Industrial Division
L and L Manufacturing Company
CHESTER 71, PENNSYLVANIA

For more data circle 584 on Reader Service Card

GEORGE SCHERR CO., INC. 200-MM LAFAYETTE STREET • NEW YORK 12, N. Y.
For more data circle 583 on Reader Service Card

new shop equipment . . .

28 inches; mounting surface to the center line of the spindle is 7⅛ inches.
For more data circle **145** on Reader Service Card

★ ★ ★

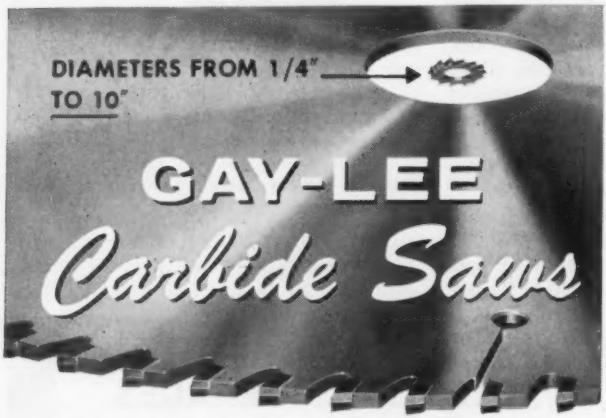
CUTTING FLUIDS

The Regal Division, Beloit Tool Corp., P. O. Box 30, Beloit, Wis., has announced the introduction of Jet-Cut Number 9 and Flo-Cut Number 15 Cutting Fluids. The manufacturer claims that both cutting fluids have been formulated under a basically new concept, in which the atomic structure of the metal and energy absorption at and below tool point are put to practical application.

The company claims that both Jet-Cut Number 9 and Flo-Cut Number 15 will excel in tapping, drilling, milling, hobbing and threading operations and have been developed expressly for the tough ductile metals such as stainless, boron, titanium steels and difficult to machine alloy steels.

Jet-Cut Number 9 Cutting Fluid can be applied directly as it comes from the can by means of a brush or squirt oiler and may be diluted if the job being performed is not too severe. Flo-Cut Number 15 Cutting Fluid is formulated for use in circulating, drip, wick and vapor or mist systems. Both types of cutting fluids are said to be odorless, non-toxic and are claimed to contain no irritants whatsoever.

For more data circle **146** on Reader Service Card



AS THIN AS YOU NEED FOR SLITTING, SLOTTING, SAWING

Make tough production problems easy with the Gay-Lee carbide-tipped "Thinsaw." Even when wafer-thin for the most delicate work, these saws provide positive alignment and rigidity that allow cutting free of run-out to full depth. Carbide tips for speed and long life, expertly brazed into a specially designed, patented seat that secures them firmly. Thickness as low as .030", thickness tolerances can be held to .0001", diameters ¼" to 10". Send details of your problem for recommendations and quotations.

GAY-LEE COMPANY
CLAWSON • MICHIGAN

For more data circle 585 on Reader Service Card

For more data circle 584 on Reader Service Card

CAST IRON COLLETS FOR CUT-OFF MACHINES

In order to prevent or reduce scratches and mars on stock being cut off on the automatic Modern Cutting-Off Machines manufactured by the Modern Machine Tool Co., 2005 Losey Ave., Jackson, Mich., this company is now producing fine grain cast iron collets and feed rolls.

The collets are divided into five moving segments to provide positive gripping of stock that may be slightly out of round. According to the manufacturer, these collets minimize marking or scratching the work.

When polished stock is being cut off, the company now furnishes a cast iron bushing that fits into an inner tube so that the stock never touches the collet. A cast iron inner sleeve is used at the rear of the guide bushing to prevent scratches.

For more data circle 147 on Reader Service Card

Modern Fine Grain Cast Iron Collet

GRINDING FIXTURE FOR SMALL PARTS

A Multi-Angle Grinding Fixture for small parts has been announced by F. E. Smith, Toolmaker, 840 South Main St., Attleboro, Mass. It is adjustable for standard and compound angles, and is particularly useful for grinding form tool bits, thread chasers, taper blocks and many other similar jobs. The fixture is heavily constructed and

GREEN MASTER FEED FINGERS SAVE TIME AND MONEY

QUICK ADJUSTMENT . . . done without removing from the machine.
NO SCORING . . . synthetic rubber inserts give rubber-to-metal contact.
UNIFORM TENSION... gives all-over wiped grip with no crimping of thin-wall tubing.
SIMPLE CONSTRUCTION . . . only four parts avoids maintenance and insures a long service life.

GREEN FULL FLOATING REAMER HOLDER

FLOATING ALIGNMENT . . . saves reamer cutting edges by compensating for any misalignment of reamer and drilled hole. Available with either standard or tapered shank.

Write for catalog sheets and prices.

GREEN MANUFACTURING COMPANY

122 S. Prairie Ave. Rockton, Illinois

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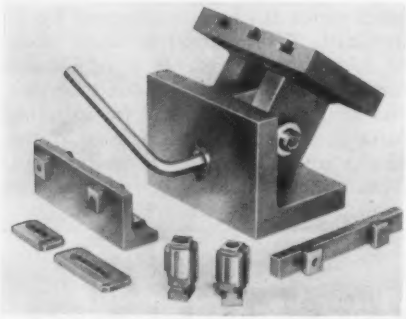
CLAWSON • MICHIGAN
For more data circle 585 on Reader Service Card

new shop equipment . . .



View of Smith's Multi-Angle Grinding Fixture

is available in two different sizes.

The work table tilts 90 degrees plus 10 degrees. The tilting table is quick and easy to set in position with a standard wrench for ⅜ inch socket head screw and locked in position after setting with the same wrench.

Mechanical parts are sealed and adjustment provided to take out backlash in the worm and gear. Work clamps, double end step hold down blocks (each end has five steps), tee nuts, stop plates and parallel are furnished as standard equipment. This tool can be used horizontally or vertically. It is claimed that Smith's Multi-Angle Grinding Fixture will save time on many small grinding jobs.

For more data circle **148** on Reader Service Card

★ ★ ★

SCREWDRIVER AND NUTSETTER TOOLS ARE IMPROVED

A series of Silver Line Portable Electric Screwdriver-Nutsetter Tools, with several engineering improvements, has been introduced by Thor Power Tool Co., Dept. EB, Prudential Plaza, Chicago 1, Ill., in the No. 10 screw or

● *Centerless Ground to extreme accuracy. Special new-type Equipment, assures concentric chamfered or formed ends—no cut-off burrs.*

Dowel - Straight - Countersunk - Angle Ends
.020" to .1875" Diameter
.125" to 2" Length

Precise Specifications
Accurately met. If requested on order surface analyses tape, showing typical surface in micro-inch measurements, is furnished. Tape magnifies 39,370 times.

Small orders or volume production to your exact specifications.

Quality Precision Work!
Prompt Deliveries!
Prices you will like!
SEND US PRINTS FOR QUOTATION

COMMERCIAL CENTERLESS GRINDING COMPANY
6605 CEDAR AVE., CLEVELAND 3, OHIO
Phone: ENdicott 1-3412

For more data circle **587** on Reader Service Card

nut capacity class. Featuring weight and size reductions up to 25 per cent, the EB Series is claimed to offer 100 per cent more power than the Thor UL Series tools they replace.

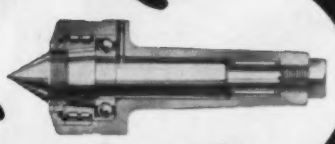
Available with bonnet toggle or lever switches, the EB Series Tools in polished aluminum housings come in speeds of 500, 1,000, 1,500 and 2,500 r.p.m. Attachment types include adjustable Double Slip and Uni-Tork clutches for precision torque assembly work. Straight or right angle attachments are available with the Double Slip clutch types, with either screwdriving or nutsetting equipment.

The engineering improvements include a machine wound armature mounted on oversize ball bearings for both forward and reverse action, centrifugal fan, heavy-duty gearing mounted on anti-friction needle bearings, reaction type brush holders for less arcing and long life with stops to prevent brush springs riding and damaging commutator, lower spindle mounted on ball bearings and suspension hook.

For more data circle 149 on Reader Service Card

Thor Silver Line EB Series Electric Screwdriver being used in subassembly

NIELSEN
Heavy Duty
Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

For more data circle 588 on Reader Service Card

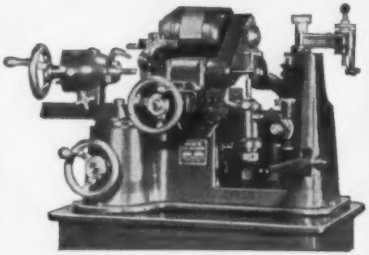
Attach this page to your letterhead and we will forward our new 16-page catalog to you.

CONICAL TOOL CO.
3801 Buchanan S.W., Grand Rapids 8, Mich.

For more data circle 589 on Reader Service Card

For more data circle 587 on Reader Service Card

HYBCO
TAP GRINDER
Sharpens Chamfers, Flutes and Spiral Points



MODEL 1100
• Capacities No. 0 Machine Screw to 1½" Hand Taps.
HENRY P. BOGGIS & CO.
708 E. 163rd St., Cleveland 10, Ohio

For more data circle 590 on Reader Service Card

new shop equipment . . .

BENCH TYPE MILL

Barker Engineering Co., 500 Green Rd., Cleveland 21, Ohio, has announced its Model A-M Milling Machine. The Model A-M constitutes a big brother to the Standard Model P-M, incorporating many of the design and operational features of the smaller drill.

It is a heavier mill with larger working surfaces for machining bigger parts. It takes No. 30MM standard adapters, will accommodate most standard indexing heads, vises and special accessories. A cast metal base is available as optional equipment. The overall height is 57 inches and total weight is approximately 650 pounds.

Specifications of this mill are as follows: heavy-duty ¾ h.p. ball bearing,

ANOTHER PANNIER MASTER MARKER!

New Roto-Pin type lock is integral part of *all* Pannier Supreme Holders . . . eliminates loose, bent, dropped, or lost pins . . . flip it open to change type . . . flip it back to securely lock type in clear-marking position.

PANNIER'S
SUPREME HOLDER
WITH ROTO-PIN LOCK
Safe, fast type changing. Holder in variety of styles. Machined from High-Grade Bar Tool Steel. Hardened anvil maintains type alignment. Striking Head of Tool Steel . . . Replaceable to add long service life to Holder.

Write for complete data.

MARKING PANNIER DEVICES
THE PANNIER CORPORATION
Offices: Los Angeles • Chicago • Cleveland • Philadelphia
202 Pannier Building • FAirfax 1-5185 • Pittsburgh 12, Pa.

For more data circle 591 on Reader Service Card

Barker Model A-M Bench Milling Machine

For more data circle 589 on Reader Service Card

totally enclosed motor; head travel is 6 inches; table travel is 10 inches; and saddle travel is 4½ inches, Micrometer feed screws can be installed on any travel at extra cost. The table has a large working surface, 6 inches wide by 20 inches long. The spindle is mounted on precision Timken bearings. A coolant system is available at extra cost.

For more data circle 150 on Reader Service Card

★ ★ ★

ELECTRIC LIMIT CONTACT GAGE FEATURES SIGNAL LIGHT ATTACHMENT

George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y., has introduced a new idea in "Go" and "No Go" Electric Limit Contact Gages — indicating by light signals. The signal light attachment used for this purpose is claimed to report accurately within 200 millionths of an inch hover and undersize, as well as correct size by flashing of green, red or yellow light. A second socket for control connection makes further automation possible.

The electric comparators come in two basic types, with and without dial. The dial type will permit observation of the position relative to tolerance limits on the dial in addition to the action of the signal lights.

Automatic controlling devices may be attached to the second sockets of the signal light box. For instance, an acoustic signal may be sounded, whereby blind persons may be employed as inspectors. Or changes in dimensions beyond tolerance limits may be announced acoustically in comparators checking running work which are not observed continuously. Small parts may be segregated according to gaging results through switches controlled by the electric limit con-

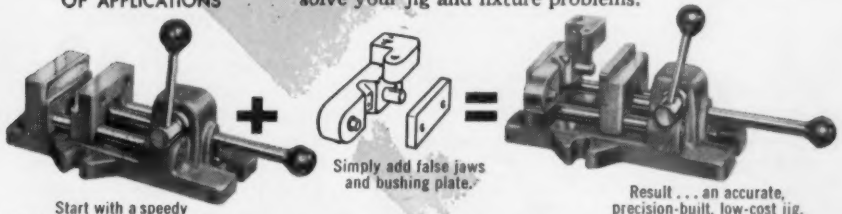
★ ★ ★ ★ ★

HERE IS JUST ONE OF THOUSANDS OF APPLICATIONS

heinrich Grip-Master

HOLDING DEVICES

speed production and cut tooling costs up to 75% and occasionally more. One glance at the example below will tell you why more and more cost conscious tool designers, nation-wide, start jigs and fixtures with a Heinrich Grip-Master. It's the easy way to solve your jig and fixture problems.



Start with a speedy Grip-Master vise and fixture base.

Simply add false jaws and bushing plate.

Result . . . an accurate, precision-built, low-cost jig.

WRITE FOR FREE CATALOG

HEINRICH TOOLS, Inc., Dept. 117G, Racine, Wis.

For more data circle 592 on Reader Service Card

Extra Capacity with
hall COLLET CHUCKS

for SPEED, ACCURACY, ECONOMY

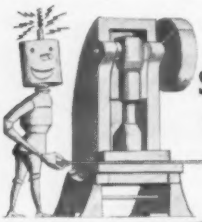
Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size. Without adjustments. Shortest overhang. All grip ...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

SATISFACTION GUARANTEED!

Made in Three Sizes to Fit Your Requirements:
Model A...1" (max. capacity 1-1/16")
Model B...2" (max. capacity 2-1/16")
Model C...3" (max. capacity 3¼")
Write today for illustrated catalog and price list—Dept. MM-7.

HALL MANUFACTURING COMPANY
622 TULAROSA DRIVE, LOS ANGELES 36, CALIFORNIA

For more data circle **593** on Reader Service Card



let this automatic
STOCK FEED STOP
cut your labor bill!

DAHLSTROM AUTOSTOP
for punch press dies

Every stroke is a production stroke when your press is equipped with the amazingly simple *Dahlstrom Autostop!* It's been tested and proven in years of actual use. Adjustable to work with *blanking, progressive or compound dies.* Mounts on stripper plate in 15 minutes—handles sheet steel up to 1/32" x 6" or equivalent weight. Lots of 12 or more, $1.50 each. State whether for compound or progressive dies.
Write for complete line bulletin describing Autostop, Tap Guides and Tap Chucks.

$1.75 each

★ SPEEDS PRODUCTION
★ CUTS WASTE
★ INCREASES PROFITS

BRANCH MFG. CO. 15 Olson Drive, North Branch, Minn.

For more data circle **594** on Reader Service Card

new shop equipment . . .

View of Scherr Electric Limit Contact Gage

tacts, and the work guided into various sorting channels. By installing auxiliary relays in the control circuit, it is said to be possible to use heavier devices with a larger electric load, such as one that stops a machine whenever the work is gaged off-size by the comparator.

For more data circle **151** on Reader Service Card

★ ★ ★

VERTICAL MILLING MACHINE HAS IMPROVED FEATURES

South Bend Lathe, South Bend 22, Ind., now has in production a vertical spindle precision milling machine with several improved design features which contribute to ease of operation, increased efficiency and more dependable performance.

The head swivels a full 360 degrees on the flanged end of the overarm for milling, drilling or boring at any angle. A substantial key with tapered gib prevents the overarm from turning in the column bearing. This per-

mits moving the head transversally without affecting angular setting of the head. New vernier graduation reading in minutes and worm gear adjustment permit quick and easy setting of the head angle with unusual precision. The overarm is 4½ inches in diameter, has 15 inch rack and pinion cross movement and can be locked rigidly at any point.

For better stability the milling machine base has been enlarged and strengthened. Additional reinforcing and bracing increase the rigidity of the base and column. For greater convenience and ease of operation, the table feed screws have been equipped with large handwheels in place of the usual ball cranks. Dual controls permit operating the table from either end. The micrometer collars on the feed screws now have a frosted finish with black graduations, a feature which eliminates glare.

Extra large dovetails provide rigid support for the table and have tight fitting scrapers to keep bearing surfaces clean. The table is 9 inches wide and is available in 32 and 42 inch lengths providing 20 or 30 inches of longitudinal travel respectively. Vertical adjustment of the table is 18 inches. Maximum distance from the table to the spindle is 20 inches, and maximum distance from the spindle to the column is 20 inches. Adjustable stops provide for regulating the length of the table feed. Measuring trays with dial indicators are available for the precision positioning of the table with the cross feed screws and longitudinal feed screws.

NEW LOW COST "SPINOSE" LIVE CENTER BY IDEAL $19.95

This new IDEAL Live Center is especially built to provide:

1. *A Low Cost Live Center* that you never have to repair. Pays for itself many times over, simply replace it at less cost than repair charges on most centers.

2. *Excellent Accuracy* insured by twin-row, angular-contact, preloaded ball bearings. Entire nose (point and bearing housing) turns with the work.

3. *Good Load Capacity* comparable to other Live Centers costing over 50% more.

4. Available in Morse Tapers 1, 2 and 3.

Check with your Distributor. You'll find that the new IDEAL "Spinose" offers more dependable service and advantages than most live centers costing up to 50% more.

For widest range of sizes, types and tapers, ask your distributor or write for data on new Ideal Gold Band Live Centers.

CALL YOUR DISTRIBUTOR OR MAIL COUPON TODAY!

IDEAL INDUSTRIES, INC. • 1031-G Park Ave., Sycamore, Ill.

Please send complete information about the new IDEAL "Spinose" Live Centers.

Name_____

Company_____

Address_____

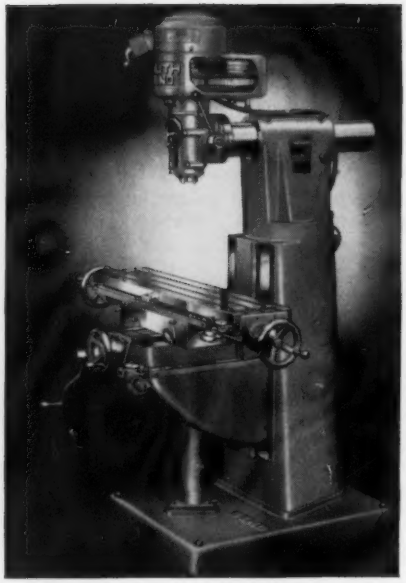
City_____ Zone____ State_____

For more data circle 595 on Reader Service Card

The spindle has a No. 30 milling machine taper with ¾ inch maximum collet capacity. Individual toolholders have up to 1 inch capacity. The spindle has a 4 inch vertical travel with lever for rapid movement and handwheel for slow feed. A dependable micrometer depth stop and positive quill lock are provided. Compound vee and timing belt drive transmits power to the spindle with unusual smoothness.

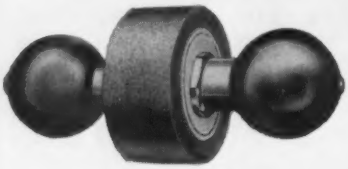
Eight spindle speeds range from 90 to 2,500 r.p.m. with ¾ h.p., 1,200 r.p.m. motor or 135 to 3,750 r.p.m. with 1 horsepower, 1,800 revolutions per minute motor.

For more data circle **152** on Reader Service Card



South Bend Vertical Spindle Milling Machine

THE *Original* METCALF
GRINDING WHEEL DRESSER



BALANCED
FAST—COOL CUTTING ACTION—
HIGH SPEED WHEEL FORMING
and CRUSHING

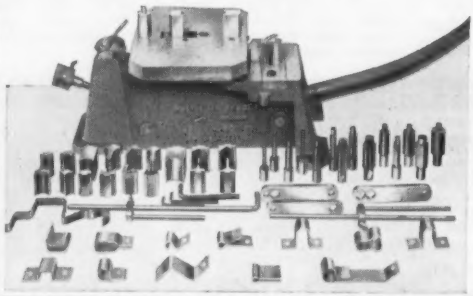
COMPLETE ASSEMBLY $7.95
EXTRA WHEEL $1.50

Made by the World's Largest Manufacturers of SAW SHARPENING and KNIFE GRINDING MACHINERY

HANCHETT MANUFACTURING COMPANY

Main Office — Big Rapids, Michigan
West Coast — Portland, Oregon

For more data circle **596** on Reader Service Card



Multiform
BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

AIR OR HAND MODELS FOR UP TO ¼" to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M — Kalamazoo, Mich.

For more data circle **597** on Reader Service Card

90 DEGREE VEE NOTCHING UNIT

Announcement has been made of the addition of completely self-contained Series B Unipunch 90 Degree Vee Notching Units to its line of products by Punch Products Corp., 3800 Highland Ave., Niagara Falls, N. Y. These Unipunch Series B 90 Degree Vee Notching Units with 5½ inch shut height and 2-19/32 inch die height are for set-ups to notch both angle and sheet material equivalent to, and including, mild steel up to ⅛ inch thick on templates, tee slotted plates and rails in presses and press brakes. A group of these vee notching units can be set up at any desired distances in unlimited notching arrangements on up to three edges of sheets or along the edge of angles for multiple notches with each stroke of the press ram. In addition, these vee notching units can be used in the same set-ups with Uni-punch Series B Perforating Units for combination round and shaped hole punching, corner notching and edge notching in the same operation.

The vee notching units may be set up outside the press and slid onto the press bed ready to produce parts with the first stroke of the press ram — no aligning, no adjusting, no press down time, nothing attached to the press ram. The one piece extra high tensile

Unipunch Series B Vee Notching Unit

You Can Use Full Working Tolerances

WITH

Em-re

DIAL INDICATORS

Patents Pending.

With "Em-re" Dial Indicators operators can always use their full working tolerances. These indicators are so accurate — and have such consistent repeatability — that there is never any need to make allowances for inherent inaccuracies or sluggishness. Tolerances read on the indicator itself can be exactly the same as those specified. "Em-re" .0001" indicators, for example, are accurate to within .00002". All "Em-re" Dial Indicators are fully jeweled — with the exclusive "Em-re" 100% shockproofing system that actually contributes to the greater accuracies obtained. Stocked in 29 models, 8 ranges from .002" to 1.000"; graduations in .00005", .0001", .00025", .0005" and .001". Also available for accurate indicator testing — the "Master" Dial Indicator Checker.

Write for catalog F.

PETZ-EMERY INC.

PLEASANT VALLEY, NEW YORK

For more data circle 598 on Reader Service Card

holder casting, which has the special characteristic that is claimed to eliminate distortion and misalignment, permanently holds the punch and die in perfect alignment.

The top front of the holder has been designed so as to permit notching angles flush to the inside leg.

QUALITY ACCURACY COLLIS DURABILITY SERVICE

COLLET
EQUIPMENT

Use-Em-Up Type Drill Sleeves
Use-Em-Up Type Drill Sockets
Standard Type Drill Sleeves
Standard Type Drill Sockets
Short Shank Type Sleeves
Short Shank Type Sockets
B. & S. Taper to B. & S. Taper Sleeves
B. & S. Taper to Standard Taper Sleeves
Standard Taper to B. & S. Taper Sleeves
Rough Shank Sockets
Solid Type Sockets
Morse Taper Shank Tap Sockets
Standard Spot Facing Cutter Bars
High Speed Point Lathe Centers
Carbon Steel Lathe Centers
Pipe Centers for Lathes
Lathe Bushings
Blank End Arbors
Chuck Arbors
Drill Drifts
Magic Type Chucks and Collets

Standard tools for all drilling, reaming, and tapping needs and special tools to order. Immediate attention to regular or special requirements.

THE COLLIS COMPANY
CLINTON, IOWA
Dept. A

For more data circle 599 on Reader Service Card

These units are available from stock in two standard sizes for maximum 1 and 1½ inch deep vees. Larger size vees are available on request.

For more data circle 153 on Reader Service Card

★ ★ ★

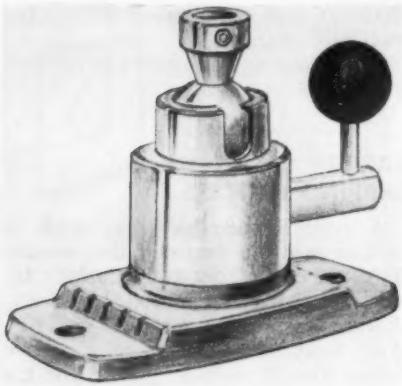
WORK POSITIONER FOR SMALL ASSEMBLY WORK

A universal work positioning fixture, called the Veep PowRarm, has been introduced by Wilton Tool Manufacturing Co., Inc., Schiller Park, Ill. A smaller version of other Wilton PowRarms, the Veep can be used with vises or special work holding attachments to move work to any position in all three planes for convenient approach. Because of its small size and compact design, it is suitable for electronics assembly or other small assembly work. One of its features is the new mounting method incorporated into the design. At the end of the shank, there is a ½ inch diameter female socket, equipped with a socket head set screw. This arrangement provides a fast, positive means of attaching work holding fixtures.

The body of the Veep is steel and is cadmium plated to prevent corrosion. Force is applied by an eccentric

GRIND THE
Eastern Centerless Way
Our new plant with increased facilities assures
PROMPT SERVICE
Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

For more data circle 600 on Reader Service Card



Wash drawing showing the Wilton Veep PowRarm Universal Work Positioning Fixture

on the main shaft. Ruggedly built, the Veep will support a work load of 15 pounds at 6 inches. The dimensions are 4 by 2¾ by 3¾ inches high, and each unit weighs about 3 pounds. Other PowRarm models have carrying capacities of 5 to 1,000 pounds.

For more data circle **154** on Reader Service Card

★ ★ ★

ATTACHMENT ELIMINATES DEEP HOLE DRILL BREAKAGE

Avey Division, The Motch and Merryweather Machinery Co., Box 625, Cincinnati 1, Ohio, has introduced an attachment which is claimed to eliminate drill breakage during deep hole drilling. Called the Metric Torque-Matic, the design allows the exact setting of torque on Avey Deep Hole Drilling Units. This attachment is calibrated so that a given number may correspond to the desired drill diameter. This is claimed to assure proper torque on the drill, which is automatically withdrawn any time this torque is exceeded.

Drill diameter charts, corresponding

BREMIL
The IMPROVED Compound Lever Shears

ALL ALLOY FULLY GUARANTEED

Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to ¼" steel plate.

BREMIL MFG. CO.
1020 Holland St., Erie, Pa.

For more data circle **601** on Reader Service Card

Magnetic Base Indicator holders

Stainless holding rod set in ball socket

Precision adjustment like surface gage

Erick
Magna Holder
Model 200B
Only $6.50

See your dealer or write for catalogue 755 on the most complete line of magnetic base units & access. mfg'd.

Powerful 50 lb. pull base

CULLEN MFG. CO., RACINE, WIS.

For more data circle **602** on Reader Service Card

CLIPPER
PRECISION DIAMOND TOOLS

Industrial Diamonds
Thread Grinders
Turning Tools
Engraving Tools
Dressing Tools
Diamond Powder

Manufacturers of
DIAMOND WHEELS
and Hones of highest quality.
Prompt delivery.
Ask for literature

Representatives in Principal Cities

CLIPPER DIAMOND TOOL CO., INC.
345-C HUDSON ST., NEW YORK 14, N. Y.

For more data circle **603** on Reader Service Card

new shop equipment . . .

Avey Metric Torque-Matic Attachment

with Metric Torque-Matic calibrations, may be prepared on any drilling job. The operator simply checks the chart to find the correct setting for each drill change.

For more data circle **155** on Reader Service Card

★ ★ ★

CARBIDE INSERT LAPPING PROCESS

A new lapping process which is said to assure a perfectly flat, smooth finish on Besly Toss-away Carbide Inserts has been announced by Besly-Welles Corporation, 108 Dearborn Ave., South Beloit, Ill., producer of a broad line of carbide tooling for the metal working industry. This process provides a highly polished surface, so fine that two carbide inserts easily wring together. According to Besly, this feature gives its Toss-away Carbide Inserts greater cutting tool life per cutting edge with less chipping and breakage.

For more data circle **156** on Reader Service Card

BEND DRUM RETURN FOR LETTERS FASTER!

WHITNEY-JENSEN No. 99
Letter Forming Bending Brakes

3/16" SLOTS
3/4" DEEP ON
1" & 1/2" CENTERS
ACCOMMODATE
SEAMED & FOLDED
DRUM RETURN

CLAMPING BY
FOOT TREADLE

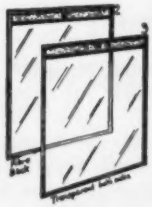
CAPACITY 20 GA.
INCLUDING
STAINLESS

HEIGHT 39"

WEIGHT ONLY
150 LBS. FOR
EASY MOVING

WHITNEY METAL TOOL COMPANY
720 Forbes St., Rockford, Ill. Since 1910

For more data circle **604** on Reader Service Card



WADE ENVELOPES

protect

Shop Orders, Drawings, Blueprints, Etc.

Two styles. No. 2 with fibre back, No. 3 transparent both sides. Non-inflammable acetate windows. Special style or size to order.

Write for details.

WADE INSTRUMENT COMPANY

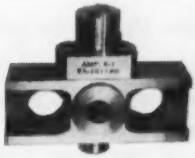
Dept. M, R.F.D. No. 1, Chardon, Ohio

For more data circle **605** on Reader Service Card

NEW

FLUSH PIN AMPLIFIER

OFFERS 5 to 1 AMPLIFICATION



• No dial indicator needed • No master required • Extremely rugged • Speeds up inspection • .001 to .010 tolerance range. WRITE FOR DETAILS.

HOLMES GAGE & DEVELOPMENT CORP.

Columbus 3, Ohio

For more data circle **606** on Reader Service Card

Press Cams

Rowbottom for Cams

Come to "Headquarters" for your needs

All types of cams . . . box, barrel, face, side . . . and hardened and ground, for tough service. Get all the benfits that come from long experience and exclusive service. *Send drawings or specifications.*

Ask for literature on Cam Millers and Grinders.

THE ROWBOTTOM MACHINE CO.

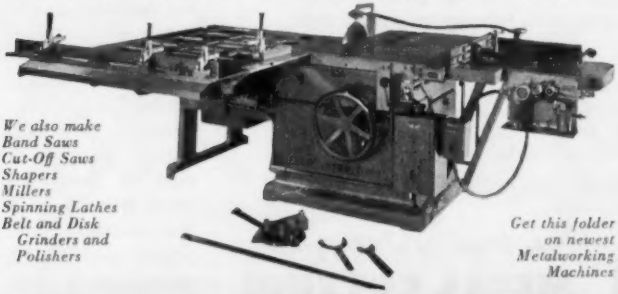
WATERBURY, CONNECTICUT

For more data circle **607** on Reader Service Card

Cut plates of aluminum, die stock, brass, micarta, plastics at low cost on the

OLIVER SAW TABLE with hydraulic feed

Cuts metals and materials up to 48" wide by 1" thick, or 42" by 4" with a 16-inch saw. Hydraulic feed of table is adjustable from 0 to 375" per minute. Equipped with V-belt drive from 10 h-p. 1800 r.p.m. motor to saw arbor. Oil mist spray for cutting nonferrous metals (as shown) is furnished as an extra. Operates continuously to close tolerances. Successfully used in largest plants. Write for bul. 88-DWH.



We also make
Band Saws
Cut-Off Saws
Shapers
Millers
Spinning Lathes
Belt and Disk Grinders and Polishers

Get this folder on newest Metalworking Machines

OLIVER MACHINERY COMPANY

Established 1890 GRAND RAPIDS 2, MICHIGAN

For more data circle **608** on Reader Service Card

new shop equipment . . .

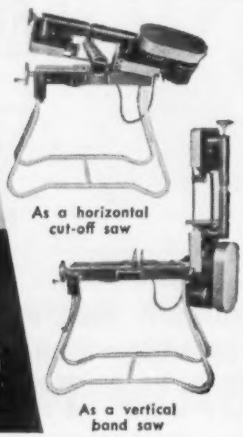
HONING MACHINE FOR SMALL DIAMETER WORK

Barnes Drill Co., 860 Chestnut St., Rockford, Ill., recently introduced the Model No. 10A1 Vertical Honing Machine, which is one of four models developed by the company for manual or automatic honing of bores from ⅜ inch to 2 inches in diameter. These machines are designed with mechanical and pneumatic actuation, therefore, eliminating hydraulic tank and piping.

Compactness, versatility and simplicity were the prime considerations for design of this line. Compactness is indicated by the floor area which, including electrical panel, is only 32 by 45 to 42 by 63 inches for the largest model. Versatility is provided by design of a basic machine with provisions for adding automatic equipment, such as a rotary indexing table, magazine feed, pregaging, bore to bore sizing by fluid, plugmatic sizing or time cycle, pneumatic hone expansion with automatic rapid expansion, feed and collapse, postgaging, sorting and ejection. This machine can also be provided with automatic shut down for continuous error or when stones are worn. Simplicity is provided by an all mechanical reciprocation and rotation of the head and spindle. On the manual Models 10M1 and 15M2, the complete cycle is controlled by two limit switches. The automatic Models 10A1

You CAN take it with you . . . or use it in the shop

THE VERSATILE WELLS 49A METAL CUTTING BAND SAW



Use the Wells 49A in the shop, or take it to the "job-site"—you'll find it an efficient tool—a time and money saver on a wide variety of metal cutting jobs.

As a horizontal cut-off tool it has a capacity of 3½" x 6". One easy motion converts it to a vertical band saw. No tools required! Just swing the head into upright position—it's ready to use. Cut angles, slots, do light contour work.

Get TWO saws for the price of ONE! Write for complete information.

Wells

The Pioneers of Horizontal
METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
808 Tyler Street • Three Rivers, Mich.

For more data circle 609 on Reader Service Card

THE UNIPASS TAP

Unipass is a newly developed tandem style tap that eliminates the excessive cost of producing Acme threads. It produces threads of from 10 to 30 included angle in a single pass without a leadscrew.

THE UNIPASS TAP

- Eliminates delay and high cost. Standard sizes are carried in stock.
- Saves on original cost because only one tool is needed.
- Saves on machine time. Does the job in a single pass.
- Can be used on steel and bronze or cast iron and brass.
- Needs no leadscrew equipment. Eliminates reaming. Does not require skilled operators.
- Produces Acme threads in one pass in nuts up to 3 times the depth of the thread diameter.

REGAL DIVISION

BELOIT TOOL CORP.

BELOIT, WISCONSIN, U. S. A.

(Dealer Inquiries Invited)

For more data circle **610** on Reader Service Card

NEW WAY OF STAMPING HEX PLUGS or around circumference of SLEEVES

As handle is turned, gear arrangement moves roller die across part being marked. Fixture uses cradle for sleeves and special table for hexes. Write for Bulletin 646.

Mecco

SAFETY G·R·D STYLE B MARKING FIXTURE

A product of the Marking Device Industry

M. E. CUNNINGHAM CO.

1051 CHATEAU STREET, PITTSBURGH 33, PA.

For more data circle **611** on Reader Service Card

25° Tilting Spindle

MAKES SET-UPS EASIER ON THE STERLING "G-2" Universal Grinder

A rugged precision grinder that gives you more versatility, extra capacity and easier operation. For complete details and specs. write for FREE Bulletin "G-2".

SHARPEN ALL DRILLS

1/8" to 2 1/2", 90° to 140° Incl. angle

Fast to set up, easy to operate. Produces precision centered drills with accurate clearance. Write for FREE Bulletin "DV-1".

McDONOUGH MFG. CO.

1521 GALLOWAY • EAU CLAIRE, WISC.

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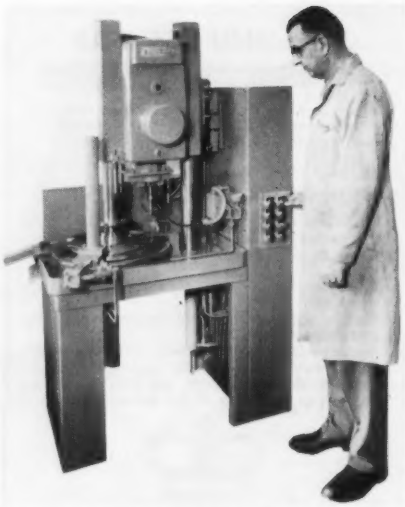
new shop equipment . . .

and 15A2 require only four limit switches.

The design provides a double post arrangement with the spindle suspended in line between the posts, thus providing the most rigidity and accuracy possible.

The line consists of four machines, although there are only two basic machines. The Model 10A1 (shown in the accompanying illustration) has a ⅜ to 1 inch inside diameter range with a 10 inch swing. The maximum spindle travel is 2½ inches with a 6 inch lift out stroke. Power is supplied by a ¾ h.p. motor. The Model 10M1 has the same capacities, but is furnished without the automatic attachments. The Models 15A2 and 15M2 have a ½ to 2 inch inside diameter range with a 15 inch swing. Maximum spindle travel is 6 inches with an 8 inch lift out stroke. These models are powered by a 2 h.p. motor.



Barnesdril Model No. 10A1 Honing Machine

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They'll cost less made from SOMMA blanks — delivery from stock.

You not only save the expense of making up blanks in your tool room, you save time as well, since same day shipment can be made on #00, #0, and #2 B&S blanks as well as Davenport form, sizing and roll blanks. Blanks also available for other machines or made of **T-5** High Cobalt Steel.

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MADE TO YOUR SPECIFICATIONS

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Design Assistance Offered

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TRUE POINT DRILL SHARPENER

for Drills 41-60 and 61-80 R.H. & L.H.

A properly sharpened drill cuts faster — more accurately and is less likely to break.

Write for circular and full details.

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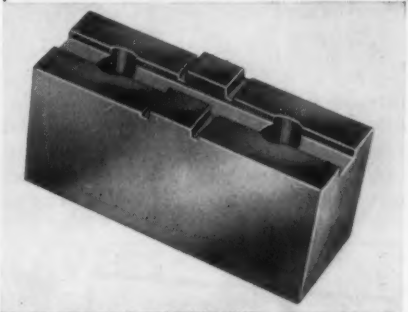

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Medium Duty Standard Height	Price per 3-jaw set
For 6" Chuck	$ 8.15
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with the **VERTICAL** design

NEW 1957 SELF CONTAINED IMPROVED MODEL FEATURING

- ✓ RIGID FLOOR BASE - ELIMINATING EXTRA CHARGE FOR TABLE
- ✓ TILTING STAGE FOR HELIX, ANGLES AND BEVELS
- ✓ 4" DIA. STAGE OPENING
- ✓ COLUMN SLIDE ADJUSTABLE FOR WEAR BY MEANS OF GIBS - WILL HOLD SQUARE INDEFINITELY.
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- ✓ AN ENTIRELY NEW PRACTICAL DESIGNED TOOL FOR INSPECTION DEPARTMENT AND PRODUCTION SHOP.

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COMPLETE LINE OF PRECISION INSTRUMENTS

200-MM LAFAYETTE STREET • NEW YORK 12, N.Y.

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new shop equipment . . .

DIE PROTECTING PRESS CONTROL

Wintriss, Inc., 200 Vandam St., New York 13, N. Y., has announced the introduction of an electronic mechanical press control to prevent tool and die damage caused by mechanical overload. Known as the Circuit Master, it consists of a mechanical sensing unit and electronic control. On first contact with an overload caused by jams, improper feeding, pileups, oversized stock, tool dullness, freezing of parts and so on, the sensing unit sends an impulse to the electronic control unit which, in turn, relays this impulse to the clutch solenoid, stopping the press immediately. Unlike micro switches, fingers and so on, which are sometimes used to protect specific sections of the die and require constant adjustment, the Circuit Master Control is claimed to protect the entire die.

The Circuit Master incorporates a compensator unit which automatically adjusts itself to normal temperature changes, voltage fluctuations and mechanical changes which occur during the running of an automatic machine.

The Circuit Master Mark II Model RI has been specifically designed for power presses using dies incorporating flattening, forming, coining and similar operations where the closed position of the die is fixed by any of the above operations. Additional sensing units may be added on the same

BEST FOR:
• UPSETTING
• PIERCING
• EXTRUDING
• FORGING

PRODUCES MORE AND BETTER PIECES BETWEEN DIE CHANGES.

A graphited product for use in working hot metals of all kinds. Good in temperatures up to 2200° F and above. Keeps work cool and extends the life of dies and punches. Highly adhesive, may be applied by brush or swab or diluted with oil for spraying.

Bulletins describing Fiske's 514A Hot Die Lubricant and other specialty lubricants and coolants sent on request.

FISKE'S
Since 1870

METAL WORKING LUBRICANTS

FISKE BROTHERS REFINING CO.
Newark 5, N. J. and Toledo 5, Ohio

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JIG BORING

and

Large Precision Machining

Done to your specifications

We have 22 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

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BLANCHARD GRINDING

To 85" diameter and up to 20" x 120"

- 24 Hour Service
- Ground Steel & Aluminum plate, any size, shape or thickness
- Weldments
- Shear blades sharpened up to 10'.

SAL METAL PRODUCTS CO.

Dept. MM,

120 Freeman St. Brooklyn 22, N. Y.

EVergreen 9-2560

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TRY "Standard" DIE MAKERS GREASE AT OUR EXPENSE!

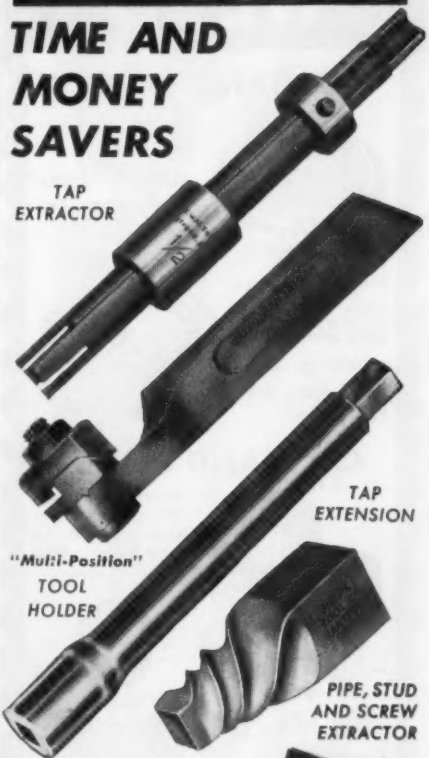
By actual independent laboratory test, this grease has proved to have lubricating qualities unequalled by any other lube. Write on your company letterhead for FREE sample tube.

STANDARD DIE SET MFRS., INC.

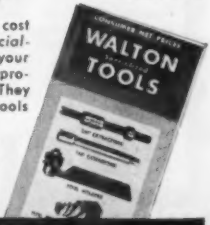
1503 Elmwood Ave., Providence 7, R. I.

WALTON Specialized TOOLS

TIME AND MONEY SAVERS



Why not investigate the cost reductions that these *Specialized Tools* can effect in your metal working shop, in production and maintenance. They outperform all ordinary tools and makeshift methods. Write for Data Folder #10. It lists sizes, prices, specifications, and gives details of our 30-day free trial offer.



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HARTFORD 10, CONN.

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C. I. HAND WHEELS

Solid web in dished and straight types. Also counter balanced.

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C. I. HAND KNOBS

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Needed in your reference file. Showing plastic and steel ball handles, compression springs and numerous other useful tool room items. Address

LONG SHANK With Wrench Hex.

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REID'S

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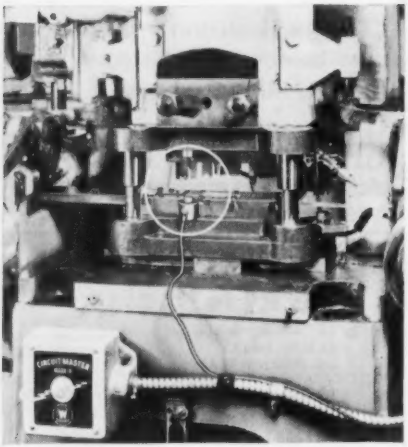


View of Wintriss Circuit Master Press Control

circuit in order to provide added control of auxiliary motions such as material feeds, transfers and others.
For more data circle **158** on Reader Service Card

★ ★ ★

SET SCREWS FOR MINIATURIZED EQUIPMENT

Mini-Mite No. 0, No. 1, No. 2, and No. 3 Set Screws, in socket, socket cap and slotted styles and in a variety of points, have been announced by Set Screw and Manufacturing Co., Bartlett, Ill. Designed for use in miniaturized equipment such as servo mechanisms, electronic equipment and so on, claimed advantages of Mini-Mite Set Screws include elimination of the need for special design set screws, watchmakers' precision, fully formed fine threads, uniformity for maximum contact with driving tools and special heat treating to give high tensile strength without brittleness or

Mini-Mite Set Screws which are available in socket, socket cap and slotted styles

decarburization. It is also claimed that these No. 0, 1, 2 and 3 Set Screws give maximum reduction in weight and bulk, without sacrificing holding power in sub or final assemblies.

In addition to a variety of styles and points, Mini-Mite No. 0, 1, 2 and 3 Set Screws are available in certain specified lengths, threaded lengths and special materials.

For more data circle **159** on Reader Service Card

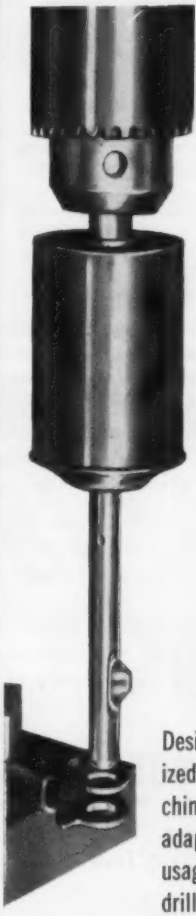
★ ★ ★

PRINTER IS CUSTOM-MADE

The Pannier Corp., 202 Sandusky St., Pittsburgh 12, Pa., has announced the availability of its Roll-Over Printer, which is custom-made to fit into regular production lines. It permanently marks free rolling products as they are guided to roll over the inked marking die. The weight of the rolling product, as it approaches the printer, trips the printing unit mechanism to ink and position the marking die. As the product rolls over the inked die, it is clearly and permanently imprinted. Either longitudinal or periferal marking can be done on the Pannier

NEW!

NOBURMATIC "H"



A Positive Action, Completely Automatic Tool for DEBURRING and CHAMFERING of FRONT and BACK SIDES of HOLES from a Single Entry!

Designed for mechanized or automated machine tools but equally adaptable to manual usage in conventional drill presses.

Write for Complete Details!

NOBUR MFG. CO.

6860 Farmdale Ave. • No. Hollywood, Calif.

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The VERDICT
'SUPERTEST'

.0005" TEST INDICATOR

Price $15.00

A rugged, sensitive worm spiral movement, of excellent materials with the finest quality workmanship, guarantees long trouble-free service and positive, repetitive accuracy.

Tubular construction permitting use of friction holder, also threaded for jig bore holder and other attachments—extreme versatility of purpose.

Unconditional guarantee.

Write for other Verdict Models .0001" to .001"

Exclusive U.S. Agents—Sales and Service—Inquiries Invited.

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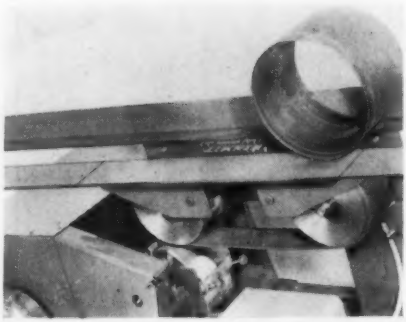
new shop equipment . . .



Pannier Custom-Made Roll-Over Printer

Roll-Over Printer and there is said to be no limit to printing surface or length of rolling product to be marked. This unit has unusual adaptability to fit all production line requirements because it is custom-made for each in-

STOP . . . breaking blades
. . . damage to material or chuck
. . . injury to operators

GO . . . chatter free, high speed
. . . straight, accurate cuts
. . . up to 40" diameter

The patented

ANTHONY CUT-OFF TOOL

Featuring the "Safety Slip" and Pivoting Trunnion.

FOR
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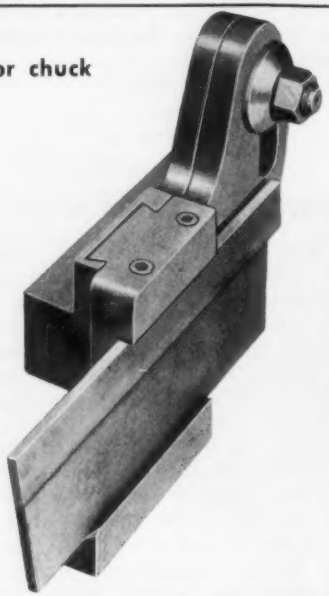
SKEE TOOL CO.
P. O. Box 2174 Austin 11, Texas



For more data circle **637** on Reader Service Card

stallation. According to the manufacturer, there is no production line slow down for automatic marking on the Pannier Roll-Over Printer; printing speed can be regulated to meet the normal line output.

Inks for this printer are available for all types of product surfaces.

For more data circle **160** on Reader Service Card

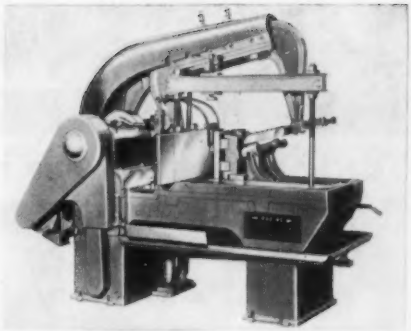
★ ★ ★

METAL CUTTING MACHINE

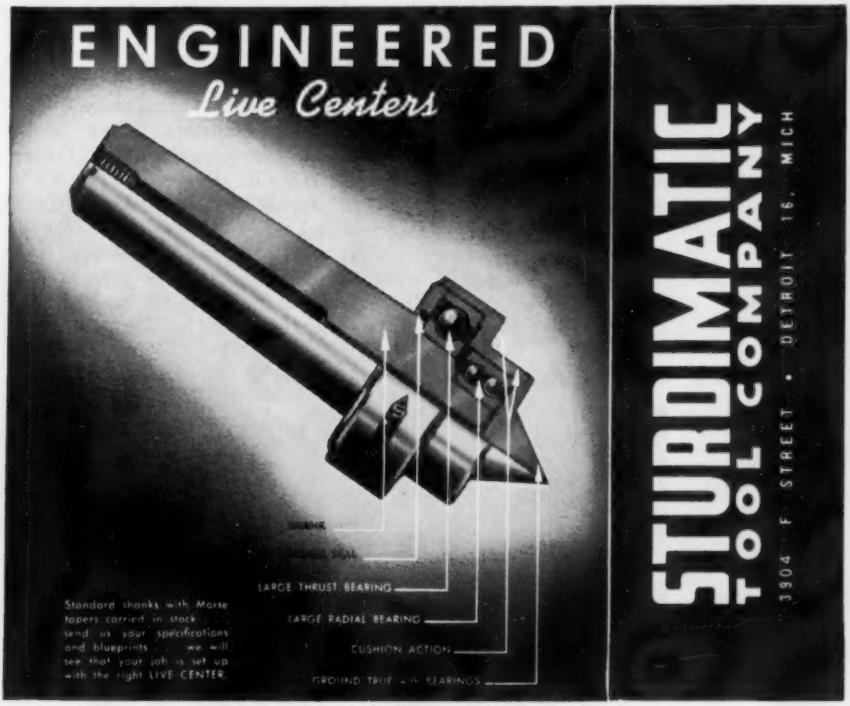
Racine Hydraulics and Machinery, Inc., 2070 Albert St., Racine, Wis., has announced its Model 20-20 Power Hack Sawing Machine, which has a capacity of 20 by 20 inches.

This machine is hydraulically controlled and the table top is only 31 inches from the floor. It incorporates a two step poly vee belt drive, giving the customer a speed range of 35 to 115 s.p.m. This unit is ideal for cutting in large sized materials such as titanium alloys, solids and so on.

For more data circle **161** on Reader Service Card



Racine Model 20-20 Power Hack Saw



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AMERICAN GEAR MANUFACTURERS ASSOCIATION

ELECTS NEW OFFICERS AND EXECUTIVE COMMITTEE MEMBERS

LeRoy R. Brooks

E. F. Borisch

John L. Buehler

Russel C. Ball, Jr.

H. G. Bauer

During the 41st Annual Meeting of American Gear Manufacturers Association held June 2-5, 1957, at The Homestead, Hot Springs, Virginia, new officers were elected for one-year terms and six members of the association were elected to serve as members of the executive committee. The officers are as follows: LeRoy R. Brooks, president, Tool Steel Gear & Pinion Co., Cincinnati, Ohio, was elected president; E. F. Borisch, executive vice president, Milwaukee Gear Co., Milwaukee, Wis., was elected vice president; and John L. Buehler, president, Indiana Gear Works, Inc., Indianapolis, Indiana, was elected treasurer.

Russell C. Ball, Jr., vice president, Philadelphia Gear Works, Inc., Philadelphia, Pa., was elected to the executive committee as were H. G. Bauer, vice president, DeLaval Steam Turbine Co., Trenton, N. J.; Lewis J. Burger, general manager, Gear Motor and Trans. Components Dept., General Electric Co., Paterson, N. J.; J. Harper Jackson, sales manager, Jackson Gear Co., Pittsburgh, Pa.; Charles L. Kessler, president, Beaver Gear Works, Rockford, Ill.; and Louis H. Schrade, executive vice president, D. O. James Gear Mfg. Co., Chicago, Ill. John C. Sears was again re-elected executive secretary of the association.

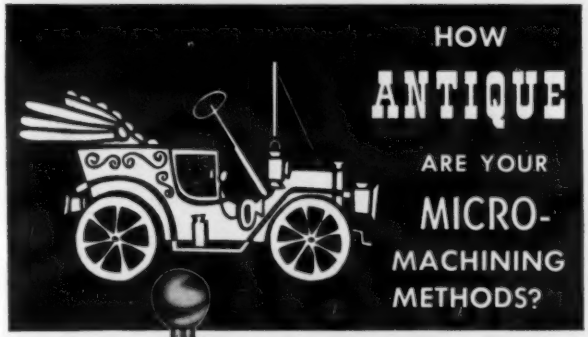
Lewis J. Burger

J. Harper Jackson

Charles L. Kessler

Louis H. Schrade

John C. Sears



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PRODUCE SMALL INSTRUMENT PARTS WITH MORE ACCURACY · ECONOMY and SPEED

ON LEVIN® INSTRUMENT LATHES

For efficiency small work should be done on a small lathe. In many cases the work done on an instrument lathe requires a degree of precision and fine finish which cannot be obtained from larger machines. LEVIN lathes are made in two collet capacities, 5/16″ or 3/16″, and thirty-three different models. Over 150 sizes of collets available in either capacity. Send for catalog "M" describing complete line of instrument lathes and accessories.

LOUIS LEVIN & SON, INC.—3610 S. BROADWAY—LOS ANGELES 7, CALIFORNIA

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NEW

Buck BORING BAR

Gives you new precision, speed, and economy

(A)

Shows why the Buck is more rigid and stronger. *Full* shank of cutter is supported by bar, locked in by three screws.

(B)

Shows adjusting screw behind cutter at end of bar. Provides adjustment to tolerances as precise as machine permits — even on 1" bars.

• • • •

There are 30 sizes of Buck Boring Bars ranging in boring capacities from a minimum of $^{25}/_{32}$" to a maximum of 6¼".

The rigidity for heavier, faster cuts — plus precision adjustment to tenths — is now available with the Buck.

You can spot the design advantages. Cutter is "out front." Provides ample chip clearance. Permits use of bigger shank for greater strength and rigidity.

The Buck uses standard cutters. Cutting edges are always on center — means less, and sometimes no, tip grinding. This, plus super rigidity, means longer cutter wear and permits using the better grade of carbide tools.

This just begins to list the many features. Write for complete details.

BUCK TOOL COMPANY

716 SCHIPPERS LANE, KALAMAZOO, MICH.

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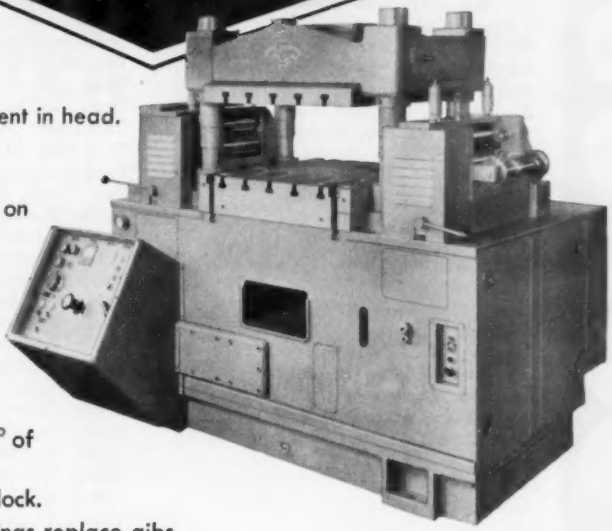
TWO POINT
BACK GEAR UNDER DRIVE
PRODUCTION PRESSES
Capacity of 75 to 200 tons



Outstanding Features

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- Center drive type herringbone gears.
- Scrap cutter action on up-stroke of press.
- Cam adjustments for brake & roll feeds.
- Micro adjustment of metal travel.
- Timing of scrap cutter from 0° to 45° of up-stroke of press.
- Positive shut height lock.
- Bronze sleeve bearings replace gibs as utilized on conventional presses.

These precision presses are basically precision operating, high-speed automatic stamping presses. They have built-in precision in the same terms as the word "precision" is associated with modern machine tools. This inherent quality has been designed into these presses from the ground up.

NO PITS REQUIRED.

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FAST, ACCURATE, WILL GIVE LONG TROUBLE-FREE SERVICE and LONG DIE LIFE.

PRESSES UP TO 300 TON CAPACITY, AVAILABLE TO CUSTOMER PARTICULAR REQUIREMENTS.

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"Die building was speeded up and costs cut when we standardized on Strippits replacing conventional die springs. Strippits eliminated counterboring for springs or stripper bolts, which also permits use of lighter die shoes. Only light stripper plates are necessary. For many dies, the even pressures and positive lengths of the Strippits eliminate the need for stripper plates or pressure pads altogether."

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"...the Wales-Way is the PLUS-PROFIT way"
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WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONT.

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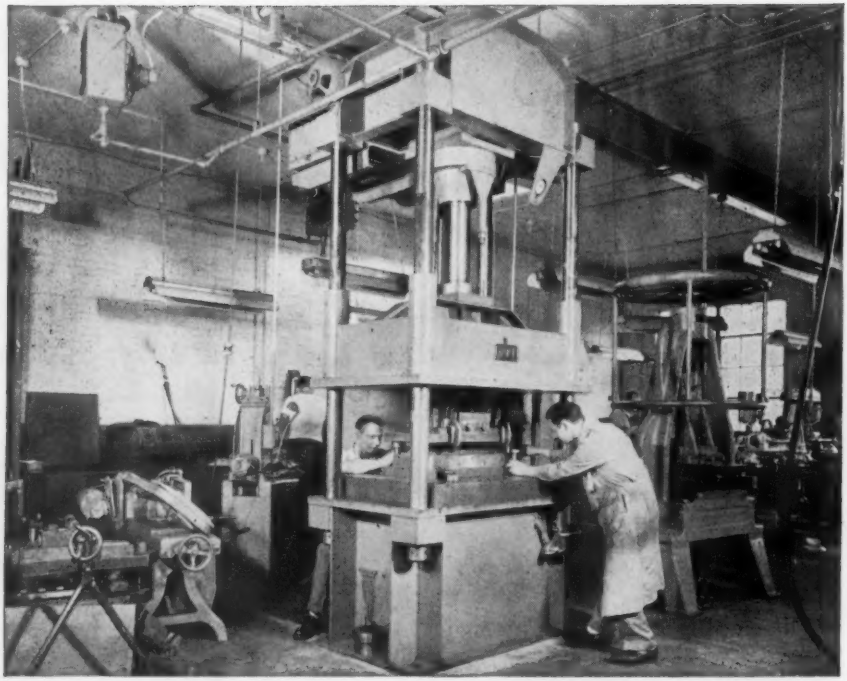

The diemaker who made a nuisance of himself

This is the story of Three Star Manufacturing Co.—a custom diemaker who serves a number of manufacturing plants in Chicago.

As in most such shops, his only means of trying out dies was a hand power screw press which sometimes needed six or seven men to get the needed pressure.

Large dies had to be tried out on his customers' production presses . . . which required drayage ($15 to $20 each way) and interruption of his customers' production. It meant both expense and nuisance to his customers and himself every time a die had to be tested.

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Specifications for DAKE single-acting and double-acting die tryout presses in eighteen electrically operated models are contained in Bulletin 330. Write today for your copy!

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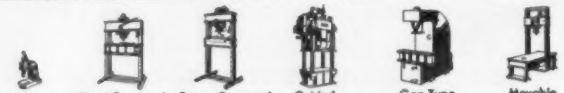

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- Chasers can be changed in a few seconds without disturbing the die head *or holders*
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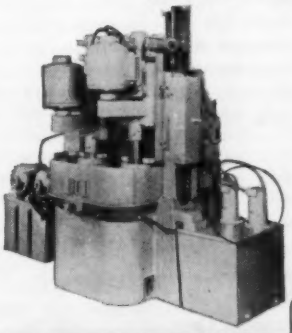
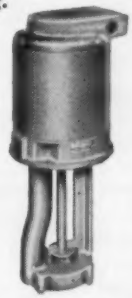
COOLANT PUMPS

REQUIRE LITTLE MAINTENANCE

Ordinarily Gusher Coolant Pumps require no attention. Because there are no packing glands to adjust and they are equipped with heavy duty prelubricated for life, ball bearings. Your maintenance worries are minimized when you specify Gusher Pumps. **Write for our Catalog.**



Illustrated is a Springfield Dual Spindle Vertical Grinder equipped with Gusher Coolant Pumps.



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Tru-Grip Tap Holder

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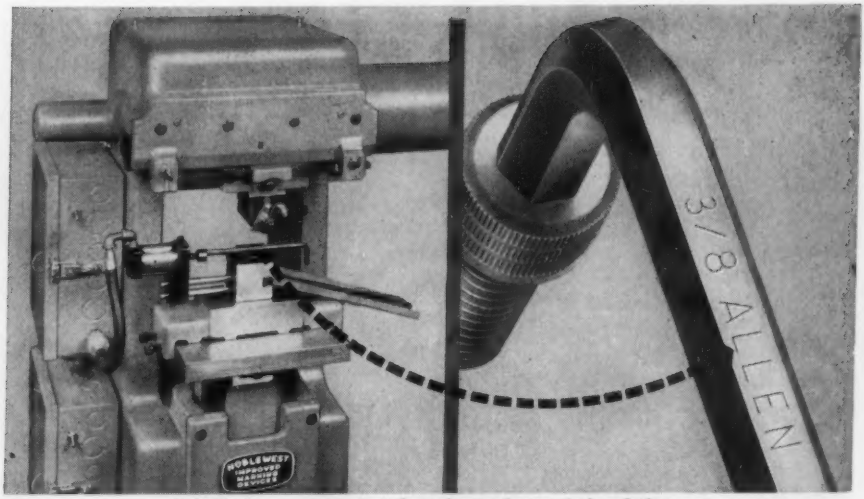

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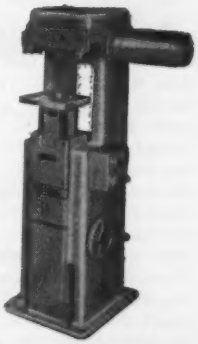
WITH NEW *Cyclomatic* CONTROL



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NOBLEWEST IMPROVED MARKING DEVICES

NOBLEWEST

ORIGINATORS OF THE ROLL MARKING PROCESS

EQUIPMENT FOR MARKING · GRADUATING · EMBOSSING · NUMBERING

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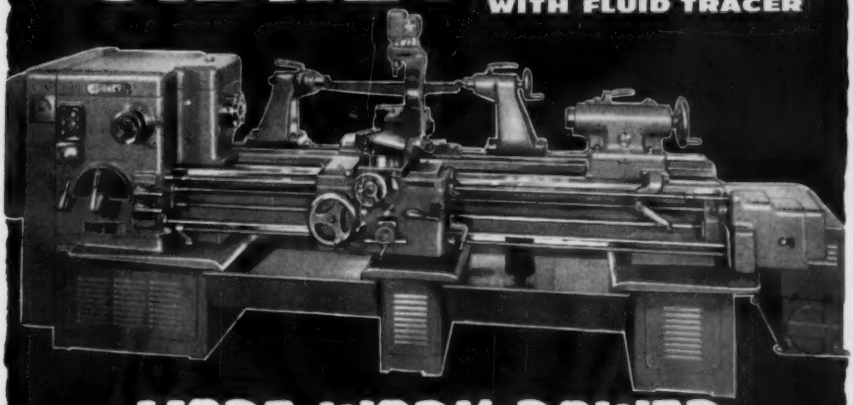
SIDNEY

MODEL 32
DIAL-MASTER
WITH FLUID TRACER



MORE WORK-POWER PER MAN IN LESS TIME !

It's fast . . . it's accurate . . . it's dependable
it's brutally strong!

But above all . . . SIDNEY MODEL 32 DIAL-MASTER WITH FLUID TRACER provides increased capacity for turning MORE WORK PER MAN than most other lathes. For standard operation this is a wonderful cutting tool . . . for unlimited reproduction the FLUID TRACER attachment turns piece after piece with unwavering precision and accuracy.
It's America's greatest, this labor-saving, time-saving, money-saving lathe.

30 OR MORE HYDRAULICALLY CONTROLLED PRE-SELECTIVE SPINDLE SPEEDS . . . ONE OF THE MANY SIDNEY "FIRSTS"

Write for bulletins or for representative to call.

Turn any shape . . . no matter how intricate or unusual

The variety of applications of extremely precise turning is practically unlimited. Hairbreadth fidelity of reproduction is assured. We used as "models" — a wine decanter, a soft drink bottle, a mold for perfume bottles and other odd pieces with the spectacular results shown.

THE SIDNEY MACHINE TOOL CO.
SIDNEY, OHIO

Builders of Precision Machinery since 1904

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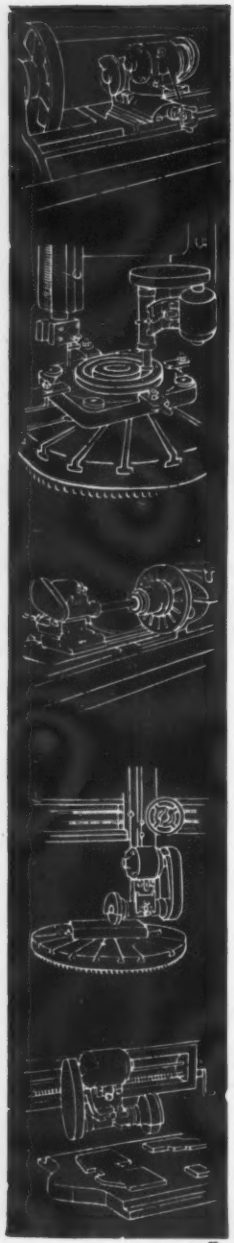

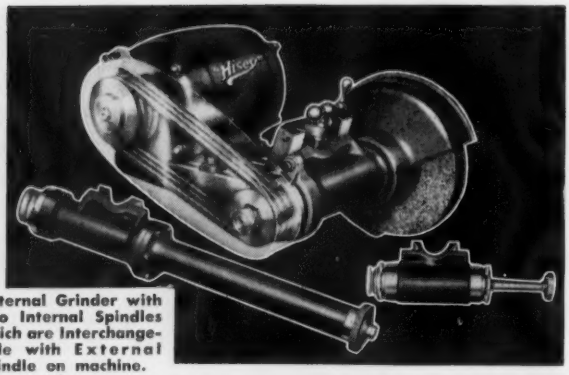

External Grinder with two Internal Spindles which are Interchangeable with External Spindle on machine.

For Precision Grinding— *External Internal Surface!*

These versatile Grinders can be mounted on lathes, planers, boring mills, milling machines and other machine tools for a large variety of grinding operations which crop up in every shop.

Rigid construction throughout with large precision type bearings insure accuracy for production and tool room work. Constant speed motors provide the uniform wheel speed so vital for best grinding results.

Dovetail slide on spindles facilitates changing from one spindle to another with perfect alignment.

Large flat pad with several bolt slots adapts the Grinder to the regular tool holding fixture of the machine on which it is to be mounted.

Large selection of Internal Spindles available for various lengths and diameters.

Made in sizes from 1/4 HP to 10 HP capacity

Other "HISEY" Products: Bench and Pedestal Grinders and Buffers; Snagging Grinders; Wet Tool Grinders; Disc Grinders; Drill Grinders and Dust Collectors.

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350 MT. HOPE AVE. • CINCINNATI 4, OHIO

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July 1957 issue

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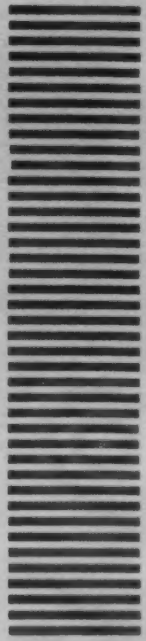

lodge & shipley model X lathe paid for itself in just 18 months!

Time savings on a single workpiece, an evaporator drum 24" in diameter and 35" long, have paid for a Model X Lathe in just 18 months. The user, York Corporation, Division of Borg-Warner, records per piece savings at $25.92, saving 172.8 minutes against a previous time of 465.5 minutes per piece. Annual savings figure to $12,400!

Conservatively priced yet ruggedly durable, Lodge & Shipley Model X Lathes are an outstanding value with speed, power and accuracy equal to lathes costing far more.

If you would like a complete case history report on the Model X performance outlined above, write today: **The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.**

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. . . your Lodge-ical choice

"Cool" savings at York Corporation, turning evaporator drum for ice-making machine; time savings alone, "better than 37%"!

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